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FOREWORD.

The National Herbarium of New South Wales contains the official collection of plants and is the centre of research work in systematic botany within the State. Prior to 1899 efforts to form a State Herbarium were of a very spasmodic nature, only a few thousand specimens being attached to the museum of the Sydney Botanic Gardens. In 1899, however, the present building was erected, and in the words of J. H. Maiden, Government Botanist at that time, "the Herbarium had at last a habitation and a home."

The first collections of New South Wales plants made by Banks and Solander in 1770 were lodged in the British Museum, and it was not until 1905 that a number of these were presented to the New South Wales Herbarium by the trustees of the British Museum. Other early collections made by Dr. John White, William Paterson, Robert Brown and George Caley were placed in various European herbaria.

In 1816 Allan Cunningham was appointed King's Botanist, and the large collections made by him were sent to the Royal Botanic Gardens, Kew, and to the British Museum. In the same year, on the establishment of the Sydney Botanic Gardens, Charles Fraser was appointed Colonial Botanist and made fairly large collections of plants. Most of them, however, were subsequently lost through neglect, the residue being sent to England. The German naturalist, Dr. Ludwig Leichhardt, collected freely between 1844 and 1846, and, although many of these specimens were sent to Germany, a number were placed in the Sydney Botanic Gardens Museum.

Charles Moore, on taking office as Colonial Botanist in 1847, stated that not a vestige remained of the herbarium formed by his predecessors. During his long term a small collection of plants was gradually accumulated, but on J. H. Maiden taking office there was still very little evidence of a representative State collection. A fairly large portfolio containing some 150 pages represents a survival of this collection. On it is written in Maiden's handwriting: "One of twelve books of specimens which constituted the National Herbarium of New South Wales up to May, 1896." In the annual report of 1898 Maiden states that the number of named specimens in the Herbarium was probably less than 15,000.

In 1899 a new building was provided, and this was formally opened in 1900. From that time onwards systematic additions were made to the collections under the supervision of Ernest Betche and Edwin Cheel, until at the present time the Herbarium contains some half a million specimens. Research work has always been active, and numerous contributions have been made by the staff to the proceedings of various scientific bodies. In addition, a number of publications, including Maiden's monumental "Critical Revision of the Genus Eucalyptus," have been issued from the Herbarium. It is now proposed, however, to issue "Contributions from the National Herbarium," of which the present number is the first part, as a means of providing for the publication of research work by the staff. Contributions of a suitable nature from other sources on systematic botany or plant biology bearing on the Australian flora will also be welcomed. It is anticipated that these "Contributions" will appear periodically in accordance with the necessity for securing publication of research work. It is hoped that they will add materially to the knowledge of the interesting and varied Australian flora, especially that of New South Wales.

R. H. ANDERSON.

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HERBARIUM
South Yarra
S.E. 1

Revision of the Indigenous Species of *Festuca* Linn. in Australia.

Joyce W. Vickery, M.Sc.

Introduction.

In the Flora Australiensis, Bentham (1878) enumerated three species of *Festuca* Linn. and three species of *Schedonorus* Beauv. from Australia.

In describing the genus *Schedonorus,* Beauvois (1812) cited a number of species, of which *Festuca elatior* Linn., the one he figured, has been accepted as the type species (see Niles and Chase, 1925). This is generally acknowledged to be a true species of *Festuca,* so that *Schedonorus* Beauv. must be regarded simply as a synonym of *Festuca* Linn. Bentham used the name *Schedonorus* Beauv. to include those species in which the caryopsis is free from the palea, not fused to it as in most species of *Festuca* Linn., but since the genus was originally based on *Festuca elatior,* in which the caryopsis is fused to the palea, this interpretation cannot now be accepted. This character, however, may prove to be of some importance and will possibly be found to separate the Australian species from the northern hemisphere species of *Festuca.* In some cases, however, the material available at present is not sufficiently mature to determine whether this character is applicable or not to the group as a whole. Meanwhile, the writer feels that it would be inadvisable to describe a new genus to include them until a thorough survey of *Festuca* Linn. and other allied genera can be made.

The present taxonomic positions of the species enumerated by Bentham under *Festuca* and *Schedonorus* are briefly discussed below.

Festuca rigida Mert. & Koch is now placed in the genus *Scleropoa* Griseb., as *Scleropoa rigida* (Linn.) Griseb. This species has been introduced into Australia from Europe. It occurs sparingly in the Sydney district as a weed of cultivation or on roadsides and railway embankments, and has been recorded from New South Wales, Victoria, South Australia and Western Australia.

Festuca bromoides Linn. is also an introduction from Europe. It is now generally placed in the genus *Vulpia* Gmel., although this genus is regarded only as a section of *Festuca* Linn. by some taxonomists. It appears sufficiently distinctive, however, to justify retaining it as a separate genus. *Vulpia* Gmel. is now represented in New South Wales by 3 species, *V. bromoides* S. F. Gray, *V. megalura* Rydb. *V. Myuros,* Gmel., which occur in the coastal and highland districts throughout the State.

Under Festuca bromoides, Bentham cited in synonymy *F. plebeia* R.Br. Examination of the type specimen at the British Museum of Natural History, however, has shown that this is a very different species. As the original description of *F. plebeia* R.Br. is very brief, an amended description is given below.

Bentham identified three specimens from Victoria and Tasmania with the European *Festuca duriuscula* Linn. Until further material from these localities becomes available, it is difficult to decide what species these represent. The material is scanty, and may possibly represent an introduced species, such as *Festuca rubra* var *genuina* Hackel.

Festuca duriuscula var. *aristata* Benth. is a distinctive plant which appears quite worthy of specific rank. As the epithet "aristata" is pre-occupied in the genus *Festuca,* it cannot be used in specific rank; I therefore propose the name *F. Benthamiana,* n. sp. As Bentham's description is very short, an amended description is given below.

Festuca scirpoidea F. Muell. (*Schedonorus scirpoidea* Benth.) is evidently restricted to Western Australia.

Festuca littoralis Labill. (*Schedonorus littoralis* Beauv.) is a common dune plant along the temperate coasts of eastern and southern Australia. *F. littoralis* var. *triticoides* Benth. (*F. triticoides* Steud.) differs from *F. littoralis* in a number of points, and appears quite worthy of specific rank. As the epithet "triticoides" is a later homonym, I propose the name *F. pubinervis* for this species.

Festuca Hookeriana F. Muell. ex Hook. f. (*Schedonorus Hookerianus* Benth.) was described in Hooker's Flora of Tasmania. In the description it is unfortunate that two distinct species were combined, the description made broad enough to cover them both, and some of the illustrations made from each. It is therefore a matter of some difficulty to decide what specimen should be regarded as the type, and for which species the name should be retained. From his remarks it is evident that Hooker himself had some suspicions that he was dealing with two distinct species. Hooker cited only one specimen (viz. Cheshunt, Archer) from Tasmania, and the main part of his illustration was evidently drawn up from this, but as he credits Mueller with the description of the species, it is likely that Mueller had in mind certain specimens from Victoria which Hooker saw but did not cite in the Flora of Tasmania. Both species, however, occur in Victoria. Mueller's subsequent comments (1873 p. 131) are also sufficiently broad to cover both species. The writer has made a careful comparison of each species with the description, and although it has obviously been drawn up from specimens of both species, there is a slightly greater degree of resemblance to the specimens collected in Tasmania by Archer. As this specimen is also the one cited, and the one most prominently figured, it seems advisable to select that specimen as the type, and retain the name *F. Hookeriana* F. Muell. ex. Hook. f. for it. On Plate CLXV in the Flora of Tasmania ii, then, Figures 1-5 are of *F. Hookeriana*, and Figures 7-8 were drawn up from specimens of *F. Muelleri* n. sp. described below. On account of the confusion between these two species, an amended description of *F. Hookeriana* is also given below.

In the following descriptions, the type specimen is indicated by the word Type, and the institution where the type is located is indicated as: B.M., British Museum of Natural History; K, The Herbarium, Royal Botanic Gardens, Kew; S, The National Herbarium, Sydney. All specimens cited have been examined by the writer.

Enumeration, Amended Descriptions and Descriptions of New Species.

✓

Festuca littoralis Labill. Pl. Nov. Holl. i. p. 22, t. 27 (1804); R. Br., Prod. (1810) p. 178.

Syn.: *Schedonorus littoralis* Beauv. Agrost. 99. (1812). *Arundo triodioides* Trin. Species Graminum 111. (1836) t. 351. *Schedonorus Billardierianus* Nees. in Hook. Lond. Journ. ii. (1843) 419.

Loc.: New South Wales: Port Jackson, R. Brown, No. 6294; Sieber, Agrostotheca, No. 58; Port Jackson District, J. H. Maiden, Nov. 1900, Kneucker Gram. Exsicc. No. 284; Illawarra, A. Cunningham; Dee Why, on sand dune, J. Vickery, 29.7.1933; Cronulla, on sand dune, J. Vickery, 3.8.1929; Gosford, J. H. Maiden, 8.1896; Curl Curl, Dean, 9.1884.

Victoria: Wilson's Promontory, F. Mueller; French Island, Beveridge; Port Philip, seashore, F.M.A., No. 485; Point Lonsdale, Josephine E. Tilden, No. 753, Oct.-Nov., 1912; Apollo Bay, C. Walter, 1887; Lakes Entrance, E. J. Sonnenberg, 4.11.1933; Warrnambool, H. B. Williamson, Nov. 1901.

Tasmania: Recherche Bay, Gunn, No. 986, 1838; without exact locality, Gunn, No. 986, 1837; Curries River, sandhills on sea, Gunn, No. 986, 22.10.1842; Kings Island, Neate; Adventure Bay, Wiles and Smith; Clifton Beach, D. Martin, Nov. 1934; Bellerive, A. H. S. Lucas, December, 1923.

Erect, caespitose, often yellowish-green perennial, inhabiting coastal sand dunes, 40-60 cm. high above ground-level, with a vertical, branching rhizome bearing long, sheathing scale-leaves; culms smooth, about 3-noded, the internodes often longer than the sheaths; nodes glabrous; sheaths somewhat striate, smooth, open to the base, the lower ones becoming rather loose from the culms; ligule firm, very obtuse, about 2 mm. long; blades convolute-terete, rigid, pungent-pointed, up to 50 cm. long, 1-15 mm. diameter, often exceeding the culms, smooth on the outer surface, deeply furrowed and densely scabrous-pubescent on the inner surface; panicle exserted laterally from the uppermost sheath, the base often remaining partly enclosed by the sheath, rarely much exserted, 8-12 cm. long, contracted and almost spike-like, rather dense, the lateral branches short, erect; rhachis scaberulous, the branches and pedicels more or less densely scabrous-pubescent, scarcely angular; spikelets 3-5 flowered, somewhat laterally compressed, yellowish, shortly pedicellate; glumes a little shorter than the spikelet, usually unequal, the lower glume the shorter, 3- sub 5-nerved, about 9 mm. long, the upper glume 5-nerved, about 10 mm. long, both glumes acute, keeled especially in the upper part, somewhat scabrous, especially on the keels; lemmas 7-11 mm. long, ovate-lanceolate in outline, obtuse or very shortly 3-fid, 5-7 nerved, obscurely and minutely ciliolate on the margins towards the apex, somewhat keeled especially in the upper part, scarbrous, especially on the keel, but otherwise glabrous; callus subglabrous; segments of the rhachilla about 1 mm. long, villous on the side away from the subtending lemma; palea nearly equal to the lemma, firm, obtuse or shortly 2-fid, scabrous on the back, scabrous-pubescent on the keels, obscurely and minutely ciliolate on the membraneous margins towards the apex, lanceolate in outline; anthers 3, linear, 5-7 mm. long; lodicules membraneous; ovary obconical, truncate; young caryopsis free from the palea.

Festuca pubinervis n. nom.

Syn. *Festuca triticoides* Steud. Syn. Pl. Gram. (1854) p. 315, non Lamarck (1791).
Schedonorus littoralis var. *triticoides* Benth., Fl. Austral, vii, (1878) p. 656.

Loc. West Australia: South-west Australia, Drummond No. 150 (Type number. K.); Swan River, Drummond, Nos. 377, 393, 450; King George's Sound, south-west coast of Australia, Captain King; Warren Drift Sands, Forest Dept., No. 63, 18.10.1916 ex Herb. Prov. Foed. Austral. Occ. K. 272.

Erect, caespitose, often yellowish-green perennial, inhabiting coastal sand dunes, 40-60 cm. high above ground level, with a rather long, branching, vertical rhizome bearing long, sheathing scale-leaves; culms smooth, 3-4-noded, the internodes either longer than or shorter than the sheaths; nodes glabrous; sheaths striate, smooth, open to the base, becoming rather loose from the culm especially the lower ones; ligule firm, that of the lower leaf obtuse, 1-2 mm. long, that of the upper leaf acute, up to 8 mm. long; blades convolute-terete, rigid, pungent-pointed, very long, up to 50 cm., 1.5-2 mm. diameter, often exceeding the culms, smooth on the outer surface, deeply furrowed and very scabrous-pubescent on the inner surface; panicle exserted laterally from the uppermost sheath, the base often remaining partly enclosed in the sheath, 8-15 cm. long, contracted and almost spike-like, rather dense, the lateral branches short, erect; rhachis scaberulous, branches and pedicels densely scabrous-pubescent, slightly furrowed but not angular; spikelets 3-4-flowered, 12-16 mm. long, laterally compressed, yellowish, shortly pedicellate; glumes slightly unequal, 12-15 mm. long, only slightly shorter than the spikelet, rather broad, more or less acute, 5-7-nerved, keeled in the upper part, very scabrous on the keels, slightly scabrous on the sides and other nerves, minutely ciliolate on the margins towards the apex; lemmas 12-15 mm. long, lanceolate in outline, obtuse or very shortly 3-toothed at the apex, 7-9-nerved, strongly keeled in the upper part, obscurely keeled below, densely scabrous-pubescent, especially on the keel, densely villous with white hairs on the nerves in the lower part; segments of the rhachilla between the lemmas about 2-3 mm. long, densely villous on the side away from the subtending lemma; callus villous; palea nearly equalling the lemma, firm, shortly villous to pubescent on the keels and sides, scabrous on the back, minutely ciliolate on the membraneous margins, lanceolate in outline, obtuse; lodicules membraneous; anthers 3, linear, 4-5 mm. long; ovary truncate, narrowly obconical; young caryopsis free from the palea, truncate, furrowed, oblanceolate, with an elongated hilum.

✓ *Festuca scirpoidea* (Steud.) F. Muell. Fragm. Phyt. Austral. viii. (1873) p. 129.

Syn.: *Brizopyrum scirpoideum* Steud. Syn. Pl. Glum. i. (1854) p. 282. *Schedonorus scirpoideus* (Steud.) Benth. Fl. Austral. vii (1878) p. 655.

Loc.: West Australia: Swan River, Drummond, No. 102 (Type number. K, S) and No. 156; without exact locality, Drummond, No. 368; East of Bruce Rock, granite outcrops, E. T. Bailey, Oct. 1932; No. K. 276; Wongan Hills, A. Morrison, 7.10.1903, No. K. 275; Merredin, M. Koch, 10.10.1923, No. 2838; Camp 93, R. Helms, 10.12.1891.

Erect, caespitose, glabrous perennial with rush-like culms arising from a short, thick rhizome, up to 100 cm. high; culms terete, smooth or minutely scaberulous, finely striate, about 1-2 mm. in diameter, without leaves or nodes except at the base; leaves reduced to closely appressed, sheathing scales at the base of the culms, the upper, longer ones 7-20 cm.; panicle narrow, spike-like, often interrupted, linear, somewhat one-sided, 5-20 cm. long, with short, erect, sparsely divided lateral branches; branches and pedicels smooth or minutely scaberulous, angular; spikelets shortly pedicellate, oblong in outline, somewhat laterally compressed, 5-7-flowered, 5-7 mm. long; glumes much shorter than the spikelet, subequal, about 4 mm. long, 1- or sub-3-nerved, acute, slightly keeled, ovate, rather broad at the base, the lower one clasping the base of the upper; lemma 4-6 mm. long, obtuse or slightly notched, ovate, rather broad at the base, rigid, minutely scaberulous, 7-11-nerved, slightly keeled towards the apex, rounded on the back below; palea slightly shorter than or subequal to the lemma, obtuse or obscurely notched, firm on the back, scabrous on the keels, minutely and obscurely ciliolate on the membraneous margins in the upper part, oblong, broad; segments of the rhachilla between the lemmas about 0.7-1.2 mm. long, slightly scabrous, with a ring of short hairs at the apex; callus slightly scabrous; anthers 3, linear, 2.5-3.5 mm. long, reddish-coloured; ovary small, ovate; stigmas dark coloured; lodicules 2, short, thick, fleshy.

✓ *Festuca Hookeriana* F. Muell. in Hook. f. Fl. Tas. ii (1860), p. 127, t. CLXV.

Syn. *Schedonorus Hookerianus* Benth. Fl. Austral. vii (1878) p. 656. *Poa Hookeriana* F. Muell. Fragm. Phytog. Austral. viii (1873), p. 131.

Loc.: New South Wales: Upper Gudgenby, Queanbeyan, R. H. Cambage, 16.1.1912, No. 3469; Brown Mountain, 1-2,000 feet, J. Vickery, 28.2.1933; Bundanoon, P. J. Hurley, 9.12.1935.

Victoria: Ballarat, Bacchus, in part; Mt. Cobberas, F. Mueller, in part; Hawkesdale, H. B. Williamson, 1919; Port Fairy, W. T. Whan.

Tasmania: Archer (Type. K); C. Stuart.

Amended Description: Erect, caespitose, subglabrous perennial, 70-120 cm. high; culms 2-3-noded, more or less smooth, striate, the internodes at length longer than the sheaths; nodes glabrous, dark-coloured; sheaths open to their bases; old lower sheaths often forming a brownish tow around the bases of the culms and innovations; upper sheaths rather broad, becoming slightly loose around the culm, more or less smooth, striate; ligule membraneous, up to 3.5 mm. long, obtuse; blades flat, folded when young, rather short in the type, much longer in some specimens, 5-40 cm. x 2-4 mm., rather rigid, often slightly auriculate at the base, scabrous on the margins and rather scabrous on both surfaces, linear to almost linear-lanceolate, acute, rather prominently channelled below, but with only low ridges on the upper surface; panicle exserted, about 30 cm. long, very loose, spreading or somewhat nodding, with long, slender, 2-3-nate branches, the internodes between the lower branches 6-9 cm. long; rhachis striate, smooth, cylindrical at least in the lower part; branches scabrous, becoming very angular in the upper part and very scabrous on the margins of the angles, the lower branches up to 22 cm. long, bare at their bases for 3-7 cm., again 2-3-nately divided, with usually 2-3 spikelets born racemosely towards the ends of the branchlets; pedicels of the lateral spikelets mostly 2-6 mm.; spikelets laterally compressed, 4-5-flowered, 9-13 mm. long, greenish or purplish; glumes 6-8 mm. long, equal or the lower either slightly longer than or slightly shorter than the upper and usually slightly narrower, scabrous on the keels in the upper part and slightly scabrous on the sides, with narrow membraneous margins, the margins usually very finely ciliolate and becoming inrolled; rhachilla segments between the lemmas about 1.5 mm. long, villous especially on the sides facing away from the lemma below, the hairs forming a more or less distinct tuft on the callus; lemmas about 8 mm. long, or the upper ones slightly shorter, very narrow lanceolate in outline, rather obscurely 5-11-nerved, keeled in the upper part, rounded on the back in the lower part, densely scaberulous, scabrous on the keel and sometimes on the other nerves, entire and acute at the apex, or minutely bifid, the keel produced into a fine, scabrous awn 0.5-3 mm. in length (sometimes shorter and quite inconspicuous on some lemmas) arising dorsally just below the apex of the lemmas, or when the tissue has split, between the short lobes; palea equalling the lemma, shortly bifid, muricately scabrous on the keels, scaberulous on the sides and back except for the narrow membraneous margins; anthers 3, linear, about 5 mm. long; very young caryopsis obovate, furrowed, the stigmas obliquely placed; mature caryopsis not seen.

✓ *Festuca Muelleri* n. sp.

Gramen erectum caespitosum subglabrum perenne, ad 150 cm. altum; culmi validiusculi, 2-4 nodis, striati, scabridissimi; internodi vaginas excedentes; nodi glabri, interdum scabridiusculi, fusci; vaginae ad bases apertae, latiusculae, ad culmos appressae vel tandem laxae, manifeste striatae, scabridissimae; ligulae membranaceae, obtusae, ad 4 mm. longae; laminae ad 45 cm. longae, lineares, acuminatae, interdum paullum auriculatæ ad bases, laxe involutae in sicco, profundissime canaliculatae et scabridissimae utrinque; panicula longe exserta, 15-25 cm. longa; rhachis manifeste striata, scabrida, ramis patentibus vel paullum nutantibus, 2-natis, ad 9 cm. longis, basibus nudis ad 3-5 cm., scabridis, paullum divisis, spiculas paucas ferentibus; pedicelli spicularum lateralum 4-10 mm. longi, scabridi; spiculae laterale compressae, 4-6-flores, 12-15 mm. longae, interdum purpurascentes; glumae subaequales, 7-8 mm. longae, acutae, 3-5-nerves, carinis scabridis supra, marginibus membranaceis; segmenta rhachillae inter lemmata circa 1.5 mm. longa, scabro-pubescentia sed haud villosa; callus glaber vel paullo laterale pubescens; lemma 8-10 mm. longum, anguste lanceolatum, manifeste 5-nerve, prominente scaberulum, remote scabridum praesertim in nervis, manifeste carinatum supra, dorso infra rotundatum, plerumque acutum, plerumque sine seta; palea lemma aequiparans, breve bifida, carinis dense scabridis, latis dorsoque dense scaberulis; antherae 3, lineares 3.5-5 mm. longae; caryopsis ab palea liber, oblanceolatus, parum subtilis illinc canaliculatus illinc costa media, circa 5 mm. longus.

Loc.: New South Wales: Barrington Tops, about 4,000 feet, L. Fraser and J. Vickery, 7.1.1934; Bimberi, Peak, Upper Cotter, near Queanbeyan, R. H. Cambage, 15.1.1921, No. 345; Mt. Franklin, A. Melvaine, March, 1939, No. A. 33.

Victoria: Mt. Buller, F. Mueller (Type. K.); Cobberas Mt., F. Mueller, in part.

Erect, caespitose, subglabrous perennial, up to 150 cm. high; culms rather stout, 2-4-noded, the internodes much exceeding the sheaths, striate, very scabrous; nodes glabrous, sometimes rather scabrous, dark-coloured; sheaths open to their bases, rather broad, adpressed to the culms, or at length somewhat loose, conspicuously striate, very scabrous; ligule membraneous, obtuse, up to 4 mm. long; blades rather long, up to 45 cm., linear, acuminate, sometimes slightly auriculate at the base, loosely inrolled when dry, very deeply channelled and very scabrous on both sides; panicle much exserted, 15-25 cm. long, the rhachis prominently striate and scabrous, with spreading or somewhat nodding, 2-nate branches up to 9 cm. in length, bare at their bases for 3-5 cm., scabrous, sparsely divided, bearing few spikelets; pedicels of lateral spikelets 4-10 mm. long, scabrous; spikelets laterally compressed, 4-6-flowered, 12-15 mm. long, sometimes purplish; glumes nearly equal, 7-8 mm. long, acute, 3-5-nerved, scabrous on the keels in the upper part, with membraneous margins; rhachilla segments between the lemmas about 1.5 mm. long, scabrous-pubescent but not villous; callus glabrous or slightly pubescent at the sides; lemmas 7-10 mm. long, narrow lanceolate in outline, distinctly 5-nerved, conspicuously scaberulous, sparsely scabrous especially on the nerves, distinctly keeled in the upper part, rounded on the back in the lower part, usually acute and not or scarcely awned; palea equalling the lemma, shortly bifid, densely scabrous on the keels, densely scaberulous on the sides and back; anthers 3, 3.5-5 mm. long, linear; caryopsis free from the palea, oblanceolate, shallowly furrowed on one side, with a median ridge on the other, curved in section, about 5 mm. long.

no X

Festuca eriopoda n. sp.

Gramen erectum, dense caespitosum, subglabrum, perenne, 50-90 cm. altum; culmi 2-3-nodes, striati, laeves, internodis vaginas excedentibus; nodi glabri, fusci; vaginae primum ad bases clausae, ad culmos appressae, latiusculae, striatae, plus minusve laeves; vaginae senescentes foliorum radicalorum interdum stuppam fuscam ad bases culmorum et innovationum fabricantes; ligulae membranaceae, pubescentes, 2-3 mm. longae; laminae foliorum inferiorum stricte plicatae, subsetaceae, tenuiter acuminatae, ad 25 cm. x 0.5 mm., striatae, scabrissimae; panicula exserta, 20-30 cm. longa; rhachis laevis, striata, ramos 2-3-natos, graciles, scabridos, ad bases 3-7 cm. nudos ferens; rami longiores paullo iterum divisi, ad apices 2-4 spiculas ferentes; pedicelli spicularum lateralum 2-10 mm. longi, scabri; spiculae laterale compressae, 10-13 mm. longae, 3-5-flores, virescentes vel purpurascentes; glumae acutae, subaequales vel gluma superior paullo longior, 3-nerves vel superior interdum 5-nervis, interdum canaliculatae inter nervos, carinis scabridis supra, latis scabriusculis, marginibus tenuitissime ciliolatis; segmenta rhachillae inter lemmata circa 2 mm. longa, unilaterale villosa; callus villosus; lemma 7-8 mm. longum vel lemmata superiores paullo breviores, obscure 5-nervis, dense scaberulum, supra carinatum, tandem dorso infra rotundatum, anguste lanceolatum, apice membranaceo, anguste truncatum et erosum vel bifidum; carina in setam minutam circa 1 mm. longam inter lobas prolongata; palea lemma aequiparans, anguste truncata et minute 2-3-fida ad apicem, carinis dense scabris, dorso et latis minute scaberulis, marginibus membranaceis; antherae 3, lineares, circa 5 mm. longae, caryopsis iuvenis obovatus, stigmatis obliquis.

Loc.: New South Wales: Blue Mountains, Kanimbla Valley (Mt. Victoria), J. J. Fletcher, 24.12.1892 (Type. K.S.); Tallwong (? Tallong), W. Forsyth, 1.1900; 12 miles north-east of Guyra, Oban-road, granite soil, 4,000 feet, Rev. E. N. McKie, No. 612, 18.12.1930; Rosewood, via Wagga, Dan McEachern, 12.1897; Canberra, A. Burges, Jan., 1931; Blackheath, A. A. Hamilton, 1.1900.

Erect, densely caespitose, subglabrous perennial, 50-90 cm. tall; culms 2-3-noded, striate, smooth, the internodes exceeding the sheaths; nodes glabrous, dark-coloured; sheaths closed at the base when young, adpressed to the culms, rather broad, striate, more or less smooth; old sheaths of the radical leaves sometimes forming a brownish tow at the bases of the culms and innovations; ligule membraneous, pubescent, 2-3 mm. long; blades of the basal leaves tightly folded, subulate, finely acuminate, up to 25 cm. long x 0.5 mm. diameter, striate, very scabrous, not auriculate at the base; panicle exserted, 20-30 cm. long, the rhachis smooth, striate, bearing 2-3-nate, slender, scabrous branches bare at their bases for 3-7 cm., the longer ones sparsely branched again, bearing 2-4 spikelets towards their ends; pedicels of lateral spikelets 2-10 mm. long, scabrous; spikelets laterally compressed, 10-13 mm. long, 3-5-flowered, greenish or purplish; glumes subequal or the upper slightly longer than the lower, 3-nerved or the upper glume sometimes 5-nerved, sometimes furrowed between the nerves, scabrous on the keels especially in the upper part, slightly scabrous on the sides, very finely ciliolate on the margins, acute; rhachilla segments between the lemmas about 2 mm. long, villous especially on the side away from the lemma below; callus bearing a tuft of hairs; lemmas 7-8 mm. long or the upper ones rather shorter, obscurely 5-nerved, densely scaberulous, keeled in the upper part, at length rounded on the back in the lower part, narrow lanceolate in outline, narrowly and erosely truncate and minutely bifid at the membraneous apex, the keel prolonged into a minute awn about 1 mm. long from between the lobes; palea equalling the lemma, densely scabrous on the keels, minutely scaberulous on the back and sides except for the membraneous margins, narrowly truncate and minutely 2-3-fid at the apex; anthers 3, linear, about 5 mm. long; very young caryopsis obovate, the stigmas obliquely placed; mature caryopsis not seen.

✓ *Festuca plebeia* R.Br., Prod. (1810) p. 178.

This species was placed with *F. bromoides* Linn. (*Vulpia bromoides* S. F. Gray) by Hooker f. in Fl. Tas. ii (1860) p. 127, and by Bentham Fl. Austral. vii (1878) p. 663. It is quite unlike that species.

Loc.: Tasmania: Table Mt., near the River Derwent, R. Brown, No. 6293 (Type. B.M.); Penquite, Gunn No. 994, 1.12.1844; Mt. Stuart, 500 feet, D. Martin, April, 1933.

Amended description: Erect, tufted, subglabrous perennial, about 70-90 cm. high; culms 1-2-noded, smooth or slightly scabrous; nodes glabrous, dark coloured; sheaths smooth on the veins, scaberulous between, adpressed to the culm, shorter than the internodes, closed at the base when young; ligule short, truncate, auriculate; blades of the radical leaves short in the type, 5-8 cm. x 1-1.5 mm., subulate, with a short callus point, more or less smooth to densely pubescent on the outer surface, scabrous-pubescent on the inner surface; panicle somewhat contracted, 7-15 cm. long, very much exserted, the peduncle 50-70 cm. long, the rhachis somewhat angular, scaberulous, with 1-2-nate scaberulous branches, the shorter bearing a single terminal spikelet, the longer up to 6 cm. and bearing 2-3 spikelets; internode between the lower branches 3-5 cm.; spikelets laterally compressed, somewhat purplish, about 15-18 mm. long, 4-7-flowered; glumes unequal, the lower 3.5-4.5 mm., 1-3-nerved, the upper 4.5-5.5 mm., distinctly 3-nerved, somewhat keeled, very sparsely scabrous, acute; lower lemmas about 8-9 mm. long, narrow lanceolate in outline, entire, acuminate, narrowed into a short, fine, scabrous awn about 1-2 mm. long, rounded on the back, 5-nerved, densely scaberulous, and somewhat scabrous towards the apex; palea equalling the lemma, very narrow lanceolate, shortly bifid, scaberulous on the back and sides, very obscurely scabrous

on the keels in the upper part; segments of the rhachilla about 2 mm. long, scabrous-pubescent on one side; callus glabrous or sparsely and minutely scabrous; anthers 3, linear, 2-2.5 mm. long; ovary obovate, the stigmas more or less terminal; caryopsis free from the palea, narrow elliptical, deeply furrowed on the back.

ho *Festuca asperula* n. sp.

Gramen erectum, dense caespitosum, paullo glauco-virescens, subglabrum, perenne, 50-100 cm. altum; culmi 2-3-nodes, plus minusve laeves, inferiores saepe breviores quam vaginae, interdum glauci supra et infra nodos; nodi glabri saepe fusci; vaginae ad bases apertae, ad culmos appressae, laeves vel scabriusculae; ligulae brevissimae; laminae convolutae, angustissime lineares vel setaceae, 15-30 cm. longae x 1 mm. diam., scabridissimae, acuminibus tenuibus callosis; panicula longe exserta, plerumque angusta, contracta vel aliquantum patens, laxa, 10-25 cm. longa; rhachis laevis, aliquantum angularis supra; rami scabri, 1-2-nati, spiculas paucas ad apices ferentes, inferiores iterum 1-nate divisi; pedicelli angulares scabridiusculi, 2-10 mm. longi; spiculae 10-15 mm. longae, 3-6-flores, laterale compressae, purpurascentes vel virescentes; glumae inaequales, gluma inferior 5-5.5 mm. longa, 1-3-nervis, superior 6-7 mm. longa 3-5-nervis, angustiusculae, acuminatae scabridiusculae marginibus minute ciliolatis; lemma 6-8.5 mm. longum, acuminatum, scaberulum et scabridiusculum praesertim supra, dorsale infra rotundatum, anguste lanceolatum, marginibus minutissime ciliolatis, seta tenui scabra terminale 1-4 mm. longa; palea 6-8 mm. longa, linear-lanceolata, plerumque minute bifida, dorso et lato scaberulo, carinis, tenuiter scabridis supra; callus glaber vel minute scabridiusculus; segmenta rhachillae inter lemmata circa 1.5-2 mm. longa, unilaterale scabrido-pubescentes; antherae 3, lineares, 4.5-5 mm. longae; ovarium obovatum, canaliculatum, stigmatibus terminalibus.

Loc.: New South Wales: Puddledock, 14 miles north-east of Armidale, 4,000 feet, on granite soil, Rev. E. N. McKie, No. 611, 5.12.1930, (Type. K.); Ben Lomond, Rev. E. N. McKie, 19.12.1936; Moona Plains, Walcha, A. R. Crawford, 11, 1898.

This species was identified with *Festuca duriuscula* Linn., by Maiden & Betche (1901, p. 89).

Erect, densely caespitose, slightly glaucous-green, subglabrous perennial, 50-100 cm. high; culms 2-3-noded, more or less smooth, the lower internodes often shorter than the sheaths; nodes glabrous, often dark-coloured, the culm sometimes glaucous just above and just below the node; sheaths open to their bases, adpressed to the culm, smooth or slightly scaberulous; ligule reduced to a very short rim; blades closely convolute, very narrow linear or setaceous, 15-30 cm. x 1 mm. in diameter when inrolled, very scabrous, with a fine callus point; panicle much exserted, usually rather narrow, contracted or somewhat spreading, loose, 10-25 cm. long, the rhachis smooth, somewhat angular above, with 1-2-nate branches bearing few spikelets towards their ends, the lower branches sometimes again 1-nately divided, all the branches scabrous; pedicels angular, somewhat scabrous, 2-10 mm. long; spikelets 10-15 mm. long, 3-6-flowered, laterally compressed, purplish to greenish in colour; glumes unequal, the lower 5-5.5 mm. long and 1-3-nerved, the upper 6-7 mm. and 3-5-nerved, rather narrow, acuminate, slightly scabrous, very minutely ciliolate on the margins; lemmas 6-8.5 mm. long, acuminate, the apex produced into a fine, scabrous awn 1-4 mm. long, slightly scabrous especially in the upper part, rounded on the back except near the apex, scaberulous, very minutely ciliolate on the margins, narrow lanceolate in outline; palea 6-8 mm. long, linear-lanceolate in outline, usually minutely bifid, scaberulous on the back and sides, finely scabrous on the keels only in the upper part; callus glabrous

or slightly minutely scabrous; rhachilla segments between the lemmas about 1.5-2 mm. long, scabrous-pubescent on one side; anthers 3, linear, 4.5-5 mm. long; ovary obovate, furrowed, with terminal stigmas; mature caryopsis not seen.

Festuca Benthamiana n. sp. ✓

Syn.: *F. duriuscula* var. *aristata* Benth. Fl. Austral. vii. (1878) p. 664.

Gramen erectum, caespitosum, subglabrum, perenne, circa 60 cm. altum; culmi laeves vel scabridiusculi, circa 2-nodis; internodi quam vaginae breviores in typo; nodi glabri; vaginae striatae, laeves, ad culmos appressae, ad bases apertae; ligulae brevissimae, circa 0.2 mm. longae, truncatae; laminae foliorum radicalorum angustissimae, convolutae et subsetaceae vel angustissimae lineares, ad 20 cm. x 0.5-1.5 mm., in acuminibus tenuissimis attenuatae, nervis scabris; laminae foliorum culmorum aliquantum planae vel laxe convolutae, circa 2-2.5 mm. latae, scabrido-pubescentes supra; panicula exserta, contracta vel patens; rhachis supra ramum primum angularis et scabridiuscula; rami plerumque 2-nati, longiores iterum 1-nate divisi, angulis scabridis; pedicelli 5-15 mm. long, scabridi; spiculae circa 15 mm. longae, setis exclusis, laterale compressae, 4-6-floribus; glumae inaequales, gluma inferior 4.5-5 mm. longa, 1-3-nervis, superior 6-7 mm. longa, 3-5-nervis, acuminatae, carinis scabridis, supra, marginibus minutissime ciliolatis; lemma circa 9-11 mm. longum, angustissime lanceolatum, scaberulum et plus minusve scabridum praesertim supra et ad margines, interdum marginibus minutissime ciliolatis, dorso rotundatum, 5-7-nerve, acuminatum, seta tenui scabra terminale 5-15 mm. longa; palea 9-11 mm. longa, brevissime bifida, angustissime lanceolata, dorso latoque scaberulo, dorso pubescente supra, carinis scabridis supra medium; segmenta rhachillae inter lemmata 2-2.5 mm. longa, scabro-pubescentia; callus glaber vel aliquantum minute scabridus; antherae lineares, circa 4 mm. longae; ovarium obovatum, canaliculatum; stigmata terminales.

Loc.: South Australia: Barossa Ranges, F. Mueller (Type. K.) (Bentham also records it from the Flinders Ranges in South Australia and Ballarat in Victoria, but I have not seen the specimens from these localities.)

Erect, caespitose, subglabrous perennial, about 60 cm. high; culms smooth or very slightly scabrous, about 2-noded, the internodes slightly shorter than the sheaths in the type specimen; nodes glabrous; sheaths striate, smooth, adpressed to the culms, open to their bases; ligule very short, about 0.2 mm. long, truncate; blades of the basal leaves very narrow, convolute, sub-setaceous or very narrow linear, up to 20 cm. x 0.5-1.5 mm., narrowed into very fine points, scabrous on the nerves; blades of the culm leaves somewhat flat or loosely convolute, about 2-2.5 mm. broad, scabrous-pubescent on the upper surface; panicle exserted, contracted or spreading, the rhachis angular and slightly scabrous above the first branch, the branches mostly 2-nate, the longer ones again 1-nately divided, angular, scabrous on the angles; pedicels 5-15 mm. long, scabrous; spikelets about 15 mm. long excluding the awns, laterally compressed, 4-6-flowered; glumes unequal, the lower 4.5-5 mm. long, 1-3-nerved, the upper 6-7 mm. long, 3-5-nerved, scabrous on the keels in the upper part, acuminate, very minutely ciliolate on the margins; lemma about 9-11 mm. long, very narrow lanceolate in outline, scaberulous and more or less scabrous especially in the upper part and towards the margins, sometimes very minutely ciliolate on the margins, rounded on the back, 5-7-nerved, acuminate, narrowed into a fine, scabrous awn 5-15 mm. in length; palea 9-11 mm. long, very shortly bifid, very narrow lanceolate in outline, scaberulous on the back and sides, pubescent on the back in the upper part, the keels scabrous above the middle; segments of the rhachilla between the lemmas 2-2.5 mm. long, scabrous-pubescent; callus glabrous or slightly and minutely scabrous; anthers linear, about 4 mm. long; ovary obovate, furrowed, with terminal stigmas; mature caryopsis not seen.

Key to the Indigenous Species of Festuca in Australia.

1. Littoral species. Leaves convolute-terete, smooth on the outer surface, densely scabrous-pubescent and deeply furrowed on the inner surface, rigid, pointed, often exceeding the flowering culms in length. Panicle contracted, rather dense and spike-like. Lemma shortly 3-notched but not awned. Rhachilla segments villous.

Section 1.

1* Species not littoral in habit. Leaves and panicle various.

2. Leaves reduced to membraneous, closely appressed, sheathing scales at the base of the rush-like, terete, rigid stems. Panicle narrow and spike-like, but interrupted.

Section 2.

2* Blades developed normally. Stems not rush-like. Panicle more or less spreading. Species mostly montane.

Section 3.

Section 1.

Lemmas and glumes 7-11 mm. long. Lemmas scabrous, 5-7-nerved.

Festuca littoralis Labill.

Lemmas and glumes 12-15 mm. long. Lemmas densely villous on the nerves in the lower part, scabrous above and between the nerves, 9-nerved. Leaves coarser than in *F. littoralis.*

Festuca pubinervis J. Vickery.

Section 2.

Lemma smooth or slightly scaberulous, about 5 mm. long, 7-nerved, obtuse or very shortly notched at the apex, broad at the base. Rhachilla segments scabrous but not villous.

Festuca scirpoidea F. Muell.

Section 3.

1. Callus bearing a tuft of hairs. Rhachilla segments villous. Sheaths and culms more or less smooth. Awn very short or absent.

2. Blades flat or folded, acute, 2-4 mm. wide, sometimes slightly auriculate at the base, more or less scabrous. Lemma usually acute with a very short dorsal awn, sometimes at length bifid with the awn between the lobes.

Festuca Hookeriana F. Muell. ex. Hook. f.

2* Blades convolute, 0.5 mm. diameter, very scabrous. Lemma narrowly and erosely truncate and bifid at the membraneous tip.

Festuca eriopoda J. Vickery.

1* Callus glabrous or slightly pubescent. Rhachilla segments scabrous-pubescent but not villous.

3. Lemmas usually awnless, more or less acute. Blades flat or loosely inrolled, 5-8 cm. wide, very deeply grooved and very scabrous. Sheaths and culms scabrous.

Festuca Muelleri J. Vickery.

3*. Lemmas distinctly awned. Blades very narrow. Culms and sheaths smooth or scarcely scabrous.

4. Awn 1-4 mm. long. Palea not pubescent.

5. Blades often short, 5-8 cm. long in the type, scabrous-pubescent on the inner surface. Lower lemmas about 8-9 mm. long. Tasmanian species.

Festuca plebeia R. Br.

5*. Blades rather long, 15-30 cm. long, very scabrous. Lemmas 6-8.5 mm. long, narrow. Mainland species.
Festuca asperula J. Vickery.

4*. Awn 5-15 mm. long. Palea pubescent on the back in the upper part. Lemmas 9-11 mm. long.
Festuca Benthamiana J. Vickery.

In conclusion the writer desires to express her thanks to Mr. R. H. Anderson, Botanist and Curator, The National Herbarium, Sydney, to Sir Arthur Hill, Director of the Royal Botanic Gardens, Kew, for his courtesy in making available to her the facilities of the Herbarium, and to Mr. C. E. Hubbard, Royal Botanic Gardens, Kew, for his many helpful suggestions during the course of the work.

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The Naturalised Flora of New South Wales (Excluding *Gramineae*).

R. H. Anderson, B.Sc.Agr.

The flora of New South Wales has undergone marked modification since the advent of the white man and the beginning of settlement. In many of the more closely settled areas the native plants are in the process of extinction and their place is being taken by introduced species. These, in many cases, have the advantage of greater rapidity of growth, the absence of natural insect enemies, and greater powers of reproduction. Some plants have shown particular aptitude for following the plough in most countries of the world and soon oust the native species once the land is given to cultivation. In parts of New South Wales the introduced plants form by far the greater part of the herbage, although the native species are still dominant on pastures never cultivated. Even on virgin land, however, many of the introduced weeds, such as Blackberry, Prickly Pear and Stinkwort show marked ability for spreading. The big majority of our weed pests have found their way into this country from other parts of the world, and there are comparatively few native plants which have become really troublesome as weeds. During recent years, however, there has been a definite tendency for some native species to become more or less serious problems on agricultural and pastoral areas.

Many of the introduced naturalised species, however, are useful fodder plants, particularly in the case of some grasses and clovers. With the introduction of such plants, however, many weeds came in as seed impurities. Probably some of these were introduced in seed and in packings from the first fleet in 1789, and many of our weeds have been recorded from the very early days of settlement. Many plants were introduced as impurities in fodder brought in during drought periods, and there is a great deal of evidence of the prolific development of weeds in the years following such importation. Quite a number of naturalised plants were originally introduced as desirable garden subjects, although subsequent experience has proved these to be troublesome weeds. Classic examples of this are the Prickly Pear and the Water Hyacinth. Paterson's Curse, St. John's Wort and Hemlock were also introduced in this way. Ballast from ships has also provided a means of introduction of plant species. The most prolific source, however, has been the importation of seed of fodder plants, much of which, however, contained weed impurities. In 1 lb. of grass seed brought in in 1919, over 175,000 weed seeds were discovered. In the course of time there appears little doubt that there will be an even greater change in the nature of our flora, as the native species in many cases are disappearing before the competition of the more vigorous and better equipped aliens.

The first published list of naturalised species in New South Wales is found in the appendix to the "Handbook of the Flora of New South Wales," Moore and Betche, 1893, p. 521. This gives a list of plants immigrated and naturalised in New South Wales and contains a total of 243 species, including twenty-four grasses. The present list gives a total of 415 species, excluding grasses, representing a very considerable increase during the past forty-five years. The list does not contain a number of species, some of which might be claimed as naturalised species. On the other hand these might be placed more correctly as garden escapes only and not truly naturalised. *Pinus radiata,* for example, reproduces itself naturally in several districts and might be included in the list but as far as possible the list has been restricted to those species which are clearly naturalised. Some species contained in the list of 1893 are no longer regarded as naturalised, having more or less disappeared from our flora. No doubt some of the species included in the present list will in the course of time also disappear.

Countries of Origin.

It is of interest to note the various countries of origin of our naturalised flora. The number of species from each country may be quoted as under:—

Europe, Asia and Africa	93
Europe and Asia	65
Europe	44
Mediterranean Regions	30
Europe and Africa	6
North Temperate Zone	7
South Africa	23
Africa	6
Tropical Africa	1
North America	24
South America	31
America	18
Tropical America	12
Central America and West Indies	11
Asia	5
China	4
Japan	1
China and Siberia	1
Tropical Asia	1
Tropical Regions	7

In addition to these there are several plants, the country of origin of which can be classified on a different basis, and we have one Western Australian species (*Albizza distachya* Macbride) which has become naturalised in New South Wales. It can thus be seen that the great majority of our introduced plants came from Europe, Africa and the American Continent. Japan and China have contributed very few of our alien plants.

Principal Families Represented.

The Family Gramineae has been excluded from the present list and will be published separately. This family, of course, contains a large number of the introduced plants, but a number of other families are also very largely represented. Leguminosae, represented by fifty species is one of the largest, as one would expect in a group of plants containing so many useful fodder species. The principal family, however, is Compositae which has supplied seventy-four species to our flora. Other families well represented are Cruciferae (twenty-seven species), Caryophyllaceae (twenty species), Scrophulariaceae, and Solanaceae (nineteen species).

In the list given below the common name in general usage is given together with the country of origin.

ARACEAE.

- Zantedeschia
  - aethiopica Spreng. Arum Lily.—South Africa.

PONTEDERIACEAE.

- Eichhornia
  - speciosa Kunth. Water Hyacinth.—Tropical America.

COMMELINACEAE.

- Tradescantia
  - fluminensis Vell. Wandering Jew.—Brazil.

LILIACEAE.

- Allium
  - vineale L. Crow Garlic.—Europe.
- Asparagus
  - officinalis L. Asparagus.—Europe and Asia.
- Asphodelus
  - fistulosus L. Asphodel.—Europe, Asia and Africa.
- Nothoscordum
  - fragrans Kunth. Wild Onion.—North America, Mexico and Africa.

AMARYLLIDACEAE.

- Alstroemeria
  - psittacina Lehm.—South America.
- Zephranthes
  - atamasco Herb.—America.
  - carinata Herb.—Central America and Jamaica.

IRIDACEAE.

- Alophia
  - pulchella Benth. and Hook. f.—South America.
- Antholyza
  - aethiopica L. African Corn-flag.—South Africa.
- Dierama
  - pendula Baker—South Africa.
- Gladiolus
  - cuspidatus Jacq.—South Africa.
- Homeria
  - collina Vent. One-leaved Cape Tulip.—South Africa.
  - miniata Sweet. Cape Tulip.—South Africa.
- Iris
  - germanica L.—Europe and Asia.
- Romulea
  - rosea Eck.—Europe and Africa.
- Sisyrinchium
  - Bermudiana L.—Bermuda.
  - micranthum ~~[illegible]~~ Cav.—South America.
- Sparaxis
  - tricolor Ker-Gawl.—Africa.
- Watsonia
  - angusta Ker-Gawl.—South Africa.

CANNACEAE.

Canna
    indica L. Indian Shot.—Tropics.

URTICACEAE.

Cannabis
    sativa L. Indian Hemp.—Asia.
Urtica
    diocia L. Tall Nettle.—Europe, Asia and Africa.
    urens L. Dwarf Nettle.—Europe, Asia and Africa.

POLYGONACEAE.

Polygonum
    Convolvulus L. Black Bindweed.—Europe and Asia.
    aviculare L. Wire Weed.—Europe, Asia and Africa.
Rumex
    acetosella L. Sorrel.—Europe, Asia and Africa.
    conglomeratus Murr. Clustered Dock.—Europe, Asia and Africa.
    crispus L. Curled Dock.—Europe, Asia and Africa.
    luxurians L.—South Africa.
    obtusifolius L. Broad-leaf Dock.—Europe, Asia and Africa.
    pulcher L. Fiddle Dock.—Europe and Asia.
    vesicarius L. Bladder Dock.—Greece, North Africa and Asia.

CHENOPODIACEAE.

Atriplex
    hastata L.—Europe and Asia.
    hortense L. Garden orache.—Europe and Asia.
    patulum L. Common orache.—Temperate zones.
Boussingaultia
    baselloides H.B. and K. Lamb's Tails.—Europe.
Chenopodium
    album L. Fat Hen.—Temperate and Tropical regions.
    ambrosioides L. Mexican Tea.—America.
    multifidum L. Scented Goosefoot.—South America.
    murale L. Nettle-leaved Goosefoot.—Europe, Asia and Africa.
    rubrum L. Red Goosefoot.—Europe and Asia.
    vulvaria L.—Stinking Goosefoot.—Europe, Asia and North America

AMARANTACEAE.

Alternanthera
    echinata Sm. Khaki Weed.—Tropical America.
Amaranthus
    albus L. Tumble Weed.—Tropical America.
    Blitum L.—Temperate and Tropical regions.
    deflexus L.—Europe.
    paniculatus L. Wild Amaranth.—North America.
    retroflexus L.—North America.
Gomphrena
    dispersa Standley.—Central America, West Indies and Florida.

PHYTOLACCACEAE.

Phytolacca
- americana L.—North America.
- octandra L. Ink Plant.—America.

Rivina
- laevis L. Coral Berry.—Tropical America.

NYCTAGINACEAE.

Mirabilis
- jalapa L. Four o'clock.—Tropical America.

AIZOACEAE.

Galenia
- secunda Sond.—South Africa.

Tetragonia
- nigrescens E. and Z. var maritima Sond.—South Africa.

Trianthema
- Portulacastrum L. Giant Pigweed.—Tropics and sub-tropics.

Mesembryanthemum
- edule L. Hotentot Fig.—South Africa.
- crystallinum L. Ice Plant.—Europe, Asia and Africa.
- cordifolium L. Heart-leaved Ice Plant.—South Africa.

PORTULACACEAE.

Calandrinia
- caulescens H.B. and K.—America.

CARYOPHYLLACEAE.

Agrostemma
- Githago L. Corn Cockle.—Europe, Asia and Africa.

Arenaria
- serpyllifolia L. A Sandwort.—Europe and Asia.

Cerastium
- glomeratum Thuill. Mouse-ear Chick Weed.—Temperate and sub-tropical regions.

Dianthus
- Armeria L. Deptford Pink.—Europe and Asia.

Paronychia
- brasiliana D.C.—South America.

Saponaria
- calabrica Guss.—Mediterranean regions.
- officinalis L. Soapwort.—Europe and Asia.
- Vaccaria L. Bladder Soapwort.—Europe, Asia and Africa.

Silene
- Cucubalus L. Bladder Campion.—Europe, Asia and Africa.
- gallica L. French Catchfly.—Europe, Asia and Africa.
- noctiflora L. Europe and Asia.
- nocturna L.—Mediterranean regions.
- quinquevulnera L.—Europe.

Spergula
- arvensis L. Corn Spurry.—Europe, Asia and Africa.

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CARYOPHYLLACEAE—*continued.*

Stellaria
media L. Chickweed.—Europe, Asia and Africa.
Tunica
prolifera Scop.—Europe.
velutina Fisch and Meyer.—Europe, Asia and Africa.

RANUNCULACEAE.

Adonis
autumnalis L.—Europe and Asia.
Ranunculus
muricatus L.—Mediterranean regions.
sceleratus L. Celery Ranunculus.—North temperate regions.

PAPAVERACEAE.

Argemone
mexicana L. Mexican Poppy.—Central America.
Eschscholtzia
californica Cham.—North America.
Fumaria
capreolata L. var. pallidiflora.—Europe and North Africa.
officinalis L. Fumitory.—Europe, Asia and Africa.
densiflora D.C.—Europe, Asia and Africa.
Glaucium
corniculatum (L.) Curt. var flaviflorum D.C.—Europe.
Papaver
dubium L. Long-headed Poppy.—Europe.
hybridum L. Wild Poppy.—Europe, Asia and Africa.
Rhoeas L. Field Poppy.—Europe, Asia and Africa.

CRUCIFERAE.

Alyssum
campestre L.—Europe and Asia.
maritimum Lam. Sweet Alyssum.—Europe.
Arabis
perfoliata Lam.—Europe and Asia.
Brassica
alba Boiss.—Europe and Asia.
campestris L. Rape or Wild Turnip.—Cosmopolitan.
oleracea L. Wild Cabbage.—Europe, Asia and Africa.
Sinapistrum Boiss. Charlock.—Europe, Asia and Africa.
Cakile
maritima Scop. Sea Rocket.—Europe.
Capsella
Bursa-pastoris Moench. Shepherd's Purse.—Temperate regions.
Coronopus
didymus (L) Sm. Lesser Swine's Cress.—America.
Diplotaxis
muralis D.C. Sand Rocket.—Europe.
Erophila
vulgaris D.C.—Europe and Asia.

CRUCIFERAE—*continued.*

Eruca
    sativa Lam.—Mediterranean regions and Asia.
Erucastrum
    incanum (L) Koch.—Europe.
Lepidium
    campestre R.Br. Field Cress.—Europe.
    Draba L. Hoary Cress.—Europe, Asia and Africa.
Lunaria
    annua L. Honesty.—Europe.
Nasturtium
    officinale R.Br. Water Cress.—Europe, Asia and Africa.
Raphanus
    Raphanistrum L. Wild Radish.—Europe, Asia and Africa.
    sativus L. Radish.—Europe.
Rapistrum
    rugosum All.—Europe and Asia.
Sisymbrium
    altissimum L. Tumbling Mustard.—Europe.
    irio L. London Rocket.—Europe, Asia and Africa.
    officinale L. Hedge Mustard.—Europe, Asia and Africa.
    orientale L. Indian Hedge Mustard.—Europe and Asia.
    Sophio L. Flixweed.—Temperate regions.
Thlaspi
    arvense L.—Europe and Asia.

CAPPARIDACEAE.

Cleome
    spinosa Jacq.—South America.

CRASSULACEAE.

Sedum
    acre L.—Europe and Asia.

RESEDACEAE.

Reseda
    lutea L. Cut-leaf Mignonette.—Europe.
    Luteola L. Wild Mignonette, Dyer's Weed.—Europe, Asia and Africa.

ROSACEAE.

Alchemilla
    arvensis Scop.—North temperate zone.
Crataegus
    oxyacantha L. Hawthorn.—Europe and Temperate Asia.
Potentilla
    recta L.—Europe and Asia.
Poterium
    Sanguisorba L. Salad Burnet.—Europe, Asia and Africa.

ROSACEAE—*continued.*

Rosa
    bracteata. Wendl.
    rubiginosa L. Briar.—Europe, Asia and Africa.
Rubus
    fruticosus L. Blackberry.—Europe.
    laciniatus Willd. Cut-leaf Bramble.—Europe.

MIMOSOIDEAE.

Albizzia
    distachya Macbride. Crested Wattle.—West Australia.

LEGUMINOSAE.

Astragalus
    hamosus L.—Mediterranean regions, Asia and India.
Cytisus
    scoparius Link. English Broom.—Europe.
    canariensis L. Cape Broom.—Europe and Africa.
    proliferus L.f. Tree lucerne, Tagasaste.—Teneriffe Isl.
Lathyrus
    sativus L.—Europe, Africa and Asia.
Lespedeza
    striata Hook. and Arn. Japanese Clover.—Japan.
Lotus
    corniculatus L. var. Sibthorpii Aschers. & Graebn.—Mediterranean regions
Lupinus
    hirsutus L. Blue Lupin.—Mediterranean regions.
    luteus L. Yellow Lupin.—Mediterranean regions.
    reticulatus Desv.—Europe.
Medicago
    arabica All. (M. maculata L.). Spotted Medick.—Europe, Asia and Africa.
    denticulata Willd. Burr Medick.—North Temperature Zones.
    hispida Gaertn. var inermis Urb.—Europe.
    intertexta Mill.—Europe.
    laciniata Mill. Cut-leaf Medick.—Mediterranean regions.
    lupulina L. Black Medick.—Europe, Asia and Africa.
    minima L. Small Burr Medick.—Europe and Asia.
    orbicularis All. Button Clover.—Mediterranean regions.
    sativa L. Lucerne.—Asia and Africa.
    scutellata L. Snail Clover.—Mediterranean regions.
    truncatula Gaertn.—Europe.
Melilotus
    alba Desv. Bokhara Clover.—Europe and Asia.
    indica All. Hexham Scent.—Europe, Asia and Africa.
    officinalis Lam.—Europe and Asia.
Onobrychis
    viciaefolia Scop.—Europe and Asia.
Ornithopus
    perpusillus L.—Europe.
Psoralea
    pinnata L.—South Africa.
Robinia
    pseud-acacia L. Black Locust.—North America.

LEGUMINOSAE—*continued.*

Trifolium
angustifolium L. Narrow-leaf Clover.—Mediterranean regions.
arvense L. Hare's Foot Clover.—Europe, Asia and Africa.
cernuum Bret. Nodding Clover.—Europe, Asia and Africa.
dubium Sibth. Small Clover.—Europe.
fragiferum L. Strawberry Clover.—Europe, Asia and Africa.
glomeratum L. Ball Clover.—Europe, Asia and Africa.
hybridum L. Alsike Clover.—Europe, Asia and Africa.
incarnatum L. Crimson Clover.—Europe.
pratense L. Red Clover.—Europe, Asia and Africa.
procumbens L. Hop Clover.—Europe, Asia and Africa.
repens L. White Clover.—Europe, Asia, Africa and America.
resupinatum L.—Europe, Asia and Africa.
striatum L. Knotted Clover.—Europe and Asia.
subterraneum L. Subterranean Clover.—Europe, Asia and Africa.
suffocatum L.—Europe.
tomentosum L. Woolly-headed Clover.—Europe, Asia and Africa.
Ulex
europaeus L. Furze or Gorse.—Europe and Africa.
Vicia
angustifolia Roth. Narrow-leaf Vetch.—Europe, Asia and Africa.
hirsuta (L.) S. F. Gray. Lentil Tare.—Europe, Asia and Africa.
sativa L. Vetch or Tare.—Europe, Asia and Africa.
tetrasperma Moench. Slender Vetch.—Europe and Asia.
villosa Roth.—Europe and Asia.

GERANIACEAE.

Erodium
Botrys Bertol. Long Storksbill.—Mediterranean regions.
cicutarium L'Herit. Storksbill.—Europe, Asia and Africa.
moschatum Willd. Musk Erodium.—Europe, Asia and Africa.
Geranium
molle L.—Europe.

OXALIDACEAE.

Oxalis
acetosella L.—North temperate regions.
cernua Thunb. Soursop or Woodsorrell.—South Africa.
lobata Sims. Chilian Woodsorrel.—Chili.
purpurata Jacq. Large-leaved Woodsorrel.—South Africa and Abyssinia.

LINACEAE.

Linum
gallicum L. Yellow Flax.—Europe.
usitatissimum L. Common Flax.—Europe.

ZYGOPHYLLACEAE.

Peganum
harmala L. Mediterranean and Asia.

POLYGALACEAE.

Polygala
- myrtifolia L. Milkwort.—South Africa.
- virgata Thunb.—South Africa.

Muraltia
- Heisteria D.C.—South Africa.

SIMARUBACEAE.

Ailanthus
- glandulosus Desf. Tree of Heaven.—China.

EUPHORBIACEAE.

Euphorbia
- helioscopia L. Sun Spurge.—Europe, Asia and Africa.
- heterophylla L.—North America.
- hirta L. Tropical and sub-tropical regions.
- L ~~l~~athyris L. Caper Spurge.—Southern Europe.
- P ~~p~~eplus L.—Petty Spurge.—Europe, Africa and Asia.
- Preslii Guss.—North America.
- prostrata Ait.—Tropical America.
- thymifolia L.—Tropical regions.

Ricinus
- communis L. Castor Oil Plant.—Asia and Africa.

SAPINDACEAE.

Cardiospermum
- hirsutum Willd. Heart Seed.—Africa.

RHAMNACEAE.

Rhamnus
- Alaternus L.—Europe.

MALVACEAE.

Malva
- nicaensis All.—Mediterranean regions.
- parviflora L.—Small-flowered Mallow.—Europe.
- rotundifolia L. Dwarf Mallow.—Europe, Asia and Africa.
- sylvestris L. Tall Mallow.—Europe, Asia and Africa.

Modiola
- caroliniana (L.) Don. (M. multifida Moench). Red-flowered Mallow.—Temperate America.

GUTTIFERAE.

Hypericum
- Androsaemum L. Tutsan.—Europe and Asia.
- perforatum L. var angustifolium D.C. St. John's Wort.—Europe.

VIOLACEAE.

Viola
- odorata L. Violet.—Europe, Asia and Africa.
- tricolor L. Pansy.—Europe and Asia.

PASSIFLORACEAE.

Passiflora
- alba Link and Otto.—Brazil.
- coerulea L.—South America.

CACTACEAE.

Opuntia
- aurantiaca Lindl. Tiger Pear.—Uruguay.
- elatior Miller.—Central America.
- imbricata D.C. Devil's Rope.—Central America.
- inermis D.C. Prickly Pear.—Central America.
- monacantha Haw. Smooth Tree Pear.—South America.

ONAGRACEAE.

Oenothera
- biennis L. Evening Primrose.—America.
- longiflora L.—Argentine.
- odorata Jacq.—Chili.
- rosea Ait.—America.
- tetraptera Cav. Four-winged Evening Primrose.—America.

UMBELLIFERAE.

Ammi—
- majus L. Bishop's Weed.—Europe, Asia and North Africa.

Bupleurum
- protractum Link. & Hoff.—Mediterranean regions.

Carum
- Petroselinum Benth. Parsley.—Europe, Asia and Africa.

Caucalis
- nodosa (L). Scop. Knotted Parsley.—Europe.

Conium
- maculatum L. Hemlock.—Europe and Asia.

Daucus
- carota L. Carrot.—Europe and Asia.

Foeniculum
- vulgare Gaertn. Fennell.—Europe and Asia.

Peucedanum
- sativum Benth. Parsnip.—Europe and Asia.

Scandix
- Pecten-Veneris L. Shepherd's Needle.—Europe, Asia and Africa.

PRIMULACEAE.

Anagallis
- arvensis L. Pimpernel.—Europe and Asia.

LOGANIACEAE.

Gelsemium
- sempervirens Ait.—North America.

OLEACEAE.

Ligustrum
- lucidum Ait. Broad-leaved Privet.—China.

Olea
- europaea L. Olive.—Mediterranean regions.

GENTIANACEAE.

Erythraea
- Centaurium Pers. Centaury.—Europe and Asia.

Microcala
- quadrangularis Griseb.—South America.

APOCYNACEAE.

Vinca
- major L. Blue Periwinkle.—Europe, Asia and Africa.

ASCLEPIADACEAE.

Araujia
- sericifera Brot.—Peru.

Asclepias
- curassavica L. Blood-flower.—South America.
- fruticosa L. Wild Cotton Weed.—Mediterranean regions.
- physocarpa Schlechter. Wild Cotton Weed.—Africa.

Oxypetalum
- coeruleum Decne.—Argentine.

CONVOLVULACEAE.

Convolvulus
- arvensis L. Field Bindweed.—Europe, Asia and Africa.

Cuscuta
- Epithymum Murray. Dodder.—Europe, Asia and Africa.
- europaea L. Dodder.—Europe and Asia.

Ipomoea
- purpurea Roth. Morning Glory.—Tropical America.
- quamoclit L.—Tropical regions.

POLEMONIACEAE.

Collomia
- grandiflora Douglas.—North America.

Gilia
- squarrosa Hook. and Arn. Californian Stink Weed.—North America.

HYDROPHYLLACEAE.

Phacelia
- tanacetifolia Benth.—California.

BORAGINACEAE.

Amsinckia
intermedia Fisch. & Mey. Yellow Burr-weed.—California.

Anchusa
officinalis L. Alkannet.—Europe and Asia.

Borago
officinalis L. Borage.—Europe, Africa and Asia.

Echium
italicum L.—Mediterranean regions.
plantagineum L. Paterson's Curse.—Southern Europe.

Heliotropium
anchusaefolium Poir.—Argentine.
supinum L.—Europe, Africa and Asia.

Lithospermum
arvense L. Corn Cromwell.—Europe, Asia and Africa.

Lycopsis
arvensis L. Small Bugloss.—Europe.

VERBENACEAE.

Lantana
camara L.—Tropical America.
crocea Jacq.—West Indies.

Verbena
bonariensis L. Purple Top.—Tropical regions.
hispida Ruiz and Pav.—South America.
venosa Gil. and Hk. Vervain.—Argentine.

LABIATAE.

Lamium
amplexicaule L. Henbit or Deadnettle.—Europe and Asia.

Lavandula
Stoechas L. Topped Lavender.—Mediterranean regions.

Leonurus
sibiricus L.—Siberia and China.

Marrubium
vulgare L. Horehound.—Europe, Asia and Africa.

Melissa
officinalis L. Common Balm.—Europe and Asia.

Mentha
piperita L. Peppermint.—Europe.
pulegium L. Pennyroyal.—Europe, Asia and Africa.
viridis L. Spearmint.—Europe, Asia and Africa.

Molucella
laevis L. Molucca Balm.—Western Asia.

Nepeta
cataria L. Cat Mint.—Europe and Asia.

Origanum
vulgare L. Marjoram.—Europe, Asia and Africa.

Salvia
aethiopis L.—Europe and Asia.
coccinea L. Texas Sage.—North America and Tropics.
reflexa Horn. Narrow-leaf Sage.—Western North America & Mexico.
Verbenaca L. Wild Sage.—Europe and Asia.

Stachys
arvensis L. Stagger Weed.—Europe, Asia and Africa.

SOLANACEAE.

Datura
- ferox L.—China.
- Metel L. Recurved Thorn Apple.—Tropical America.
- Stramonium L. Thorn Apple.—Cosmopolitan, tropical and temperate regions.
- tatula L.—Cosmopolitan, tropical and temperate regions.

Lycium
- chinense Mill.—Chinese Boxthorn.—China.
- ferocissimum Miers. African Boxthorn.—South Africa.

Nicandra
- physaloides Gaertn. Apple of Peru.—South America.

Nicotiana
- glauca Graham. Tree Tobacco.—America.

Physalis
- indica Lam.—Tropical regions.
- peruviana L. Cape Gooseberry.—South America.

Solanum
- aculeatissimum Jacq.—Tropical Asia and America.
- auriculatum Ait. Wild Tobacco Tree.—Tropical Asia.
- elaeagnifolium Cav. Silver-leaved Nightshade.—Tropical America.
- pseudo-capsicum L. Madeira Winter Cherry.—America.
- rostratum Dunal. Buffalo Burr.—North America.
- sodomaeum L. Apple of Sodom.—Europe, Asia and Africa.
- triflorum Nutt. Cut-leaved Nightshade.—North America.

SCROPHULARIACEAE.

Antirrhinum
- Orontium L. Small Snapdragon.—Europe, Asia and Africa.

Bartschia
- latifolia Sibth. Eye-bright.—Mediterranean regions.
- Trixago L.—Europe and Africa.
- viscosa L.—Europe and Mediterranean regions.

Hebenstreitia
- dentata L.—Africa.

Linaria
- cymbalaria Mill. Ivy-leaved Toad-flax.—Europe.
- Elatine Mill. Hairy Toad-flax.—Europe and Asia.
- genistifolia Mill. Broom-leaved Toad-flax.—Europe and Asia.
- Pelisseriana L. Pelisser's Toad-flax.—Europe and Asia.
- spuria Mill. Round-leaved Toad-flax.—Europe and Africa.
- vulgaris L. Common Toad-flax.—Europe and Asia.

Mimulus
- moschatus Dougl. Monkey Musk.—North America.

Orthocarpus
- erianthus Benth.—California.
- purpurascens Benth. Purple Owl-clover.—North America.

Verbascum
- Blattaria L. Spurious Mullein.—Europe, Asia and Africa.
- Thapsus L. Great Mullein.—Europe and Asia.
- virgatum Stokes. Twiggy Mullein.—Europe.

Veronica
- agrestis L. Creeping Speedwell.—Europe, Asia and Africa.
- arvensis L. Field Speedwell.—Europe, Asia and Africa .

MARTYNIACEAE.

Martynia
- diandra Glox. Small-fruited Devil's Claw.—Brazil and Mexico.
- lutea Lindl.—Brazil.
- proboscidea Glox. Devil's Claw.—North America.

PLANTAGINACEAE.

Plantago
- arenaria W. et K. Sand Plantain.—Europe and Asia.
- Coronopus L. Buck's-horn Plantain.—North temperate zone.
- lanceolata L. Ribwort.—Europe and Asia.
- major L. Large Plantain.—Europe, Asia and Africa.

RUBIACEAE.

Galium
- aparine L. Goose Grass.—Europe, Asia and Africa.

Richardsonia
- pilosa H.B.K. Mexican Clover.—Tropical America.
- stellaris Cham.—Brazil.

Sherardia
- arvensis L. Field Madder.—Europe.

CAPRIFOLIACEAE.

Lonicera
- caprifolium L. Honeysuckle.—Europe.
- sempervirens L. Trumpet Honeysuckle.—N. America.

DIPSACACEAE.

Scabiosa
- maritima L. Pincushion.—Mediterranean regions and Canary Islands.

CUCURBITACEAE.

Citrullus
- vulgaris Schrad. Wild Water Melon.—Tropical Africa.

Cucumis
- myriocarpus Naud. Paddy-melon.—Africa.

CAMPANULACEAE.

Lobelia
- debilis (Presl.) L.f.—South Africa.
- Erinus L.—South Africa.

COMPOSITAE.

Acanthospermum
australe (Loefl). Kuntze.—South America.
Achillea
millefolium L. Milfoil.—Europe, Asia and America.
Ageratum
conyzoides L.—Tropical regions.
Ambrosia
artemisifolia L. Ragweed or Wormwood.—North America.
psilostachya DC. Perennial Ragweed.—North America.
Anthemis
Cotula L. Stinking Mayweed.—Europe, Asia and Africa.
Arctium
Lappa L. Burdock.—Europe.
Artemisia
vulgaris L. Mugwort.—North Temperate Zone.
Aster
subulatus Michx. Bushy Starwort.—North America.
Carduus
lanceolatus L. Black Thistle.—Europe and Africa.
pycnocephalus Jacq. Slender Thistle.—Europe and Asia.
Calendula
arvensis L. Wild Marigold.—Europe and Asia.
Carthamus
glaucus Breb. Glaucous Star Thistle.—Asia Minor, Persia and Egypt.
lanatus L. Saffron Thistle.—Europe, Asia and Africa.
tinctorius L. Safflower.—Europe, Asia and Africa.
Centaurea
calcitrapa L. Star Thistle.—Europe, Asia and Africa.
melitensis L. Cockspur.—Europe, Asia and Africa.
picris Pall. Hard Heads.—Caspian regions.
solstitialis L. St. Barnaby's Thistle.—Europe, Asia and Africa.
Chondrilla
juncea L. Skeleton Weed.—Europe and Asia.
Chrysanthemum
leucanthemum L. Ox-eye Daisy.—Europe and Asia.
segetum L. Corn Marigold.—Europe, Asia and Africa.
Cichorium
Intybus L. Chicory.—Europe, Asia and Africa.
Cirsium
arvense Scop. Perennial Thistle.—Europe, Asia and Africa.
Cnicus
benedictus L. Blessed Thistle.—Mediterranean regions.
Crepis
foetida L. Fetid Hawk's Beard.—Europe and Asia.
setosa Hall f.—Europe and Asia Minor.
virens L. Smooth Hawk's Beard.—Europe and Caucasus.
Cryptostemma
calendulaceum R.Br. Cape Weed.—Africa.
Cynara
Cardunculus L. Wild Artichoke or Cardoon.—Mediterranean regions.

COMPOSITAE—*continued.*

Erigeron
bonariensis L.—South America.
canadensis L. Canadian Flea-bane.—America.
linifolius Willd. Flax-leaved Flea-bane.

Eupatorium
glandulosum H.B. et K. Giant Hemp Agrimony.
riparium Regel. Hemp Agrimony.—Mexico.

Galinsoga
parviflora Cav. Potato Weed.—America.

Grindelia
squarrosa Dunal. Pitch Weed.—America.

Hedypnois
cretica Willd. Cretan Weed.—Mediterranean regions.

Hemizonia
pungens Torr & Gray.—California.

Hypochoeris
glabra L. Smooth Flat Weed.—Europe, Asia and Africa.
radicata L. Flat Weed.—Europe, Asia and Africa.

Inula
graveolens Desf. Stinkwort.—Mediterranean regions.

Lactuca
saligna L. Wild Lettuce.—Europe, Asia and Africa.
Scariola L. Prickly " ~~Pear~~.—Europe and Central Asia.

Lapsana
communis L.—Europe and Asia.

Madia
sativa Mol. Tar Weed.—America.

Matricaria
discoidea DC. Chamomile.—Asia and North America.

Onopordon
acanthium L. Scotch Thistle.—Europe, Asia and Africa.
acaulon L. Stemless Thistle.—Mediterranean regions.

Osteospermum
moniliferum L.—South Africa.

Pascalia
glauca Orteg. Pascalia Weed.—Chili.

Picris
echioides L. Ox Tongue.—Europe, Asia and Africa.
hieracioides L. Hawkweed Picris.—Europe, Asia and Africa.

Scolymus
maculatus L. Spotted Golden Thistle.—Mediterranean regions.

Senecio
crassiflorus DC.—South America.
Jacobaea L. Ragwort.—Europe and Asia.
mikanioides Otto. Cape Ivy.—South Africa.
vulgaris L. Groundsel.—Europe.

Silybum
marianum Gaertn. Variegated Thistle.—Europe.

COMPOSITAE—*continued.*

Soliva
  anthemifolia R.Br.—Recorded as a native of Queensland in Bentham's Flora Australiensis, but the New South Wales plants are classed as probably introductions from South America.
  sessilis Ruis and Pav. Jo-Jo.—North and South America.
Sonchus
  asper Hill. Rough Sowthistle.—Cosmopolitan.
  oleraceus L. Sowthistle.—Cosmopolitan.
Tagetes
  glandulifera Schrank. Stinking Roger.—Tropical America.
Tanacetum
  vulgare L. Tansy.—Europe and Asia.
Taraxacum
  officinale Weber. Dandelion.—Temperate regions.
Tolpis
  umbellata Bertol.—Mediterranean regions.
Tragopogon
  porrifolius L. Salsify.—Europe.
Verbesina
  encelioides Bth. and Hk. Crownbeard.—America.
Xanthium
  spinosum L. Bathurst Burr.—South America.
  chinense Mill. Noogoora Burr.—Mexico.
Zinnia
  elegans Jacq.—Mexico.
  pauciflora L.—North and South America.

Additions to the Australian Myrtaceae

Angophora dichromophloia Blakely, sp. nov.

Arbor gracilis, 12-40 pedes (ca. 3.6-12.2 m.) alta, 4-12 uncias (ca. 10-30 cm.) diametro; cortex asper, trunco paucos pedes persistens, hinc glaber, per partem stipitis ramorumque superiorem rubescens. Folia opposita, glabra, coriacea, lanceolata, petiolata vel sessilia 10-23 cm. longa, 2.5-5.5 cm. lata. Inflorescentia terminalis vel infraterminalis, paniculata vel corymbosa, minute pubescens, setosa; umbellae 3-4-florae; pedunculi compressi 1.5-3 cm. longi; gemmae turbinatae, costatae, pedicellatae, sub-hispidae, 12-15 mm. longae, 9-10 mm. latae, calyx 9-10 costatus, cuius dentes subulati, 4-5 mm. longi. Petala 4-5, glabra, 5-6 mm. longa, 4-5 mm. lata. Fructus pedicellatus, ovoideus, minute hirsutus, subsetosus, 20-23 mm. longus, 15-17 mm. latus, 8-10-costatus, pedicelli 7-11 mm. longi.

A slender tree 12 to 40 feet high, with a trunk diameter of 4 to 12 inches; bark dark grey, rough and persistent on trunk for several feet, then becoming smooth and deciduous, usually of a salmon pink colour. Leaves opposite, smooth, coriaceous, lanceolate, usually petiolate, but occasionally a few sessile, cordate or lobed at the base, 10-23 x 2.5-5.5 cm., glossy, dark green above, dull and pale-coloured beneath, the venation very fine in the lanceolate, petiolate leaves, distant and more or less irregular in the sessile or cordate ones. Internodes angular or compressed. Inflorescence terminal or infraterminal, paniculate to corymbose, minutely pubescent and setose, with very fine and rather long setae. Umbels 3-4 flowered; peduncles compressed, 1.5-3 cm. long, with a pair of foliaceous deciduous bracts at the apex of the peduncles. Buds costate, turbinate, pedicellate, slightly hispid with scattered setae, 12-15 x 9-10 mm.; pedicels somewhat angular, 10-15 mm. long. Calyx turbinate, 9-10 ribbed, 9-10 x 12-15 mm., the teeth subulate, 4-5 mm. long. Sepals 4-5, the thick fleshy portion almost triangular, acuminate, the petaloid portion thin and white, quite smooth, not minutely pubescent as in *A. cordifolia,* 5-6 x 4-5 mm., the aristate points 1-3 mm. long.

Fruit pedicellate, ovoid, slightly contracted at the top, minutely hairy and sparingly setose, 20-23 x 15-17 mm. 8-10 ribbed, the primary ribs longer than the calycine portion, or narrowly winged, terminating in broad, uncinate points; secondary ribs much shorter, expanded upwards into short winged points; pedicels terete or slightly flattened, rather thick, 7-11 mm. long.

It occurs over a wide range, either as isolated trees here and there or in small clumps of three to twenty trees, from Northbridge south of the Hawkesbury to Penang Range north of the River. It is usually found on very dry sandstone, but it also grows in moderately moist places, and sometimes on the margin of the shale and sandstone; the following are the localities:—

> Junction-road, Hornsby, near Public School, the type. W. F. Blakely, 11.11.1928; Northbridge, W. F. Blakely and W. Buckingham, 28.12.1936; Waitara—Normanhurst, below the railway line, sepals and filaments pale pink, W. F. Blakely, 26.12.1928; Boundary-road, Hornsby, near creek, W. F. Blakely, 2.2.1929; Spring Gully Creek, Hornsby, about three hundred yards south of the septic tank, W. F. Blakely, 8/1936; ½ mile west of Maroota Trig., Maroota, near Beckett's Forest. W. F. Blakely and D. W. C. Shiress, 15.9.1929; Canoe Grounds, W. F. Blakely and D. W. C. Shiress, 16.9.1929; Bywater, same collectors, 26.9.1929; Mooney Mooney, W. F. Blakely, 2/1937. Between Woy Woy and Woy Woy-Gosford road, rough and smooth barked trees, 20-30 feet high, growing with *A. cordifolia,* W. F. Blakely and D. W. C. Shiress, 29.12.1927. Panang Range, Gosford, "There is a quantity of this here; the trees are about 1 foot in diameter and about 30 or more feet high. The capsules and bark are very like *A. cordifolia,* but the foliage is different." A. Murphy, 5/1914.

It is readily distinguished from all the other species by the two kinds of bark and large dimorphic leaves. Its position is near *A. cordifolia* from which it differs in size, habit, and bark, greener and usually lanceolate foliage, in the more paniculate inflorescence, three-flowered umbels, slightly smaller fruits and glabrous sepals.

Large trees have the appearance of *A. costata* (Gaertner) Domin in the upper portion of stem and branches, but on the whole it is a smaller tree than *A. costata*, with a rough persistent bark on trunk for several feet, larger flowers and fruit, and broader foliage, which is sometimes sessile and cordate at the base on the uppermost branchlets.

Eucalyptus Burdettiana Blakely and Steedman.

Frutex sex pedes (ca. 2 m.) altus. Folia matura alterna, petiolata, lanceolata, 6-8 cm. longa, 0.8-2.5 cm. lata; umbellae 3-5- florae; pedunculi ligulati, erecti vel deflexi, 2-3 cm. longi, 0.8-1.2 cm. lati; gemmae sessiles, cylindricae, obtusae, 5 cm. longae; calyx obconicus, 15 x 12 mm.; operculum cylindroideum, basi abrupte dilatatum; filamenta recta, subglandulares; antherae versatiles, rimis longis dehiscentes. Fructus subglobosus, turbinatus, sessilis, ligneus, sub-rugosus, unicostatus, 2-2.5 cm. longus, 2.5-3 cm. latus; discus striatus, annulo calycino altior, super capsulam trilocularem cupolam crassam formans.

A shrub about six feet, with branches spreading, branchlets yellowish and angular, bark smooth, greenish. Mature leaves alternate, shortly petiolate, lanceolate, thick, opaque, dark green, obscurely veined, 6-8 x 0.8-2.5 cm., veins very fine, diverging at an angle of 25-30 deg. from the midrib, the intramarginal vein fairly close to the thick nerve-like margin; oil dots very small and numerous. Umbels axillary, 3-5 flowered; peduncles ligulate, rather thick and woody, dilated upwards, erect or nodding, 2-3 cm. long, 0.8-1.2 cm. broad. Buds sessile, cylindrical, obtuse, 5 cm. long, pale green; calyx-tube obconical, smooth, faintly one-nerved, darker in colour than the operculum, 15 mm. long, 12 mm. in diameter at the top; operculum green, slightly verrucose, abruptly expanded at the base, the central position 7-8 mm. in diameter. Filaments straight in bud, yellowish green, in two rows, compressed at the base, angular upwards, obscurely glandular; anthers versatile, long and narrow, attached near the base, opening in longitudinal slits. Ovary convex, somewhat rugose-striate, higher than the calycine ring, with three small ovate nectaries at the base of the slender angular style. Fruit somewhat globose-turbinate, sessile, woody, faintly rugose, one-nerved, the striated disc very thick, conspicuously raised above the calyx rim, forming a striate dome over the three-celled capsule, 2-2.5 cm. long, 2.5-3 cm. in diameter.

Western Australia—Mount Barren, near Hopetoun, on stony outcrops, H. Steedman, 1/1938. This exceedingly quaint and interesting species is named in honour of W. Burdett of Basket Range, South Australia, a leading cultivator of Australian plants.

It belongs to series Cornutae, and partakes of the characters of *E. cornuta*. The buds and fruits, however, are much larger, and somewhat different in shape and sculpture, while the valves of the fruit do not end in long subulate points like those of its ally. It has almost the same shaped buds as *E. annulata*, but the fruits of the latter are basin-shaped with wide-spreading deltoid valves. The valves of *E. Burdettiana* are almost concealed by the conspicuous disc. It is a useful species for small and large gardens; it withstands moderately high and low temperatures; it is of good form, with fairly large greenish flowers, and quaintly sculptured fruits. It flowers from November to January, and it should be a very useful bee-plant, as the flowers are heavily laden with pollen and nectar.

Eucalyptus gomphocephala A.DC. var. *rhodoxylon* Blakely and Steedman, var. nov. "Red Tuart." Variat ligno rubro.

A handsome tree 80 feet high or more, with a splendid bole up to 50 feet, and 2½ feet in diameter, the branches rather short and compact. Bark rough and persistent, thick, matted, fibrous, except the outer surface which is somewhat corky, dark grey, and fissured irregularly, and beneath it a thin layer of white spongy bark. Timber dark red when green, drying a light red with a glossy sheen, slightly open and wavy in the grain, moderately hard, the fibres long and tough, sapwood thin, yellowish white. Juvenile leaves not seen. Intermediate leaves alternate, petiolate, ovate-lanceolate to ovate-acuminate, rounded or oblique at the base, dark green above, pale beneath, the veins few and distant, 6-8 x 5-6 cm. or larger; petioles terete or nearly so, 2-2.5 cm. long. The leaves are more acutely acuminate than those of the species, otherwise there is no essential difference between them. Mature leaves as in the species, but of thicker texture and very glossy on both sides. Buds similar to those of the species. Fruit shortly pedicellate, turbinate—campanulate, fairly thick, 14-15 x 14-15 mm.; crowned with a small fleshy annular disc; valves 4, woody, slightly exserted.

"There are only five of these trees within 30 or 40 yards of each other; these are suckers from old stumps, growing in black sandy soil on a small rise just off a permanent creek, in association with Jarrah and Marri. They are 10 miles or more from Tuart country in the Guildford district, near Perth. The old settlers will not believe that they belong to the Tuart tribe. The old trees must have been of gigantic size as the old stumps at ground level are 6 feet or more across. It seems a mystery how they got there."—H. Steedman, November, 1937.

This tree is markedly distinct from the species in the colour of the timber, and therefore, it cannot be classed with it and is deserving of a varietal name. It is difficult to account for the colour of the timber, as all the other botanical characters, especially the seedlings, do not show any signs of hybridization. The tree is an interesting one and requires further research, and should be preserved for future study by the botanist and forester.

E. eremophila (Diels) Maiden, var. *pterocarpa* Blakely and Steedman var. nov. "Rock Gum." Variat foliis brevioribus, pedunculis longis ligulatis 3-floribus, fructis alatis.

A small slender tree or mallee about 10 feet high, with a smooth deciduous bark, and reddish-brown branchlets.

Mature leaves shortly petiolate, alternate, narrow lanceolate, abruptly acute or uncinate, gradually tapering into the yellowish petioles, 3.5-5 x 0.8-1 cm., thick, venation obscure, even the midrib inconspicuous, shining on both surfaces, minutely and copiously dotted; umbels 3-flowered; peduncles deflexed, strap-shaped, with sharp edges and 2-3 longitudinal ribs, 4-6 cm. long, 5-8 mm. broad. Buds shortly pedicellate, horn-shaped; calyx narrowly winged or 2-4 angled, 8-10 mm. long; operculum cylindroid or horn-like, rather smooth, yellowish-brown, 15-25 mm. long, 5-6 mm. broad at the base; filaments straight, pale green; anthers long, versatile, the cells parallel; pedicels winged, 4-6 mm. long. Fruit pedicellate, pyriform, truncate, 2-4 ribbed, two of the ribs sometimes expanded into narrow wings, 14-15 x 10-12 mm. the disc forming a broad ring around the contracted orifice, and slightly lower than the calycine ring; capsule 4-6 celled deeply enclosed, only the needle-like tips protruding; pedicels quadrangular or compressed according to the number of angles on the fruit, 5-8 mm. long. Amongst rocks near Hatters Hill, Ravensthorpe district, West Australia, H. Steedman, January, 1938.

In the absence of complete data it is difficult to say whether it is specifically distinct from *Eucalyptus eremophila* from which it differs in the shorter leaves, long strap-shaped peduncles bearing 3 flowers, and in the peculiar winged fruits, which somewhat resemble those of *Eucalyptus diptera.* It is a handsome variety, and is worthy of cultivation in regions free from heavy frosts. It flowers about February, or March, and the flowers yield abundance of white powdery pollen and a clear sweet nectar.

Eucalyptus crenulata, Blakely et de Beuzeville sp. nov., "Silver Gum." Arbor parva, subglauca, 25-30 pedes (ca. 7.5—9 m.) alta. Folia matura opposita, sessilia, amplexicaulia vel brevipetiolata, orbicularia, cordata vel cordato-lanceolata, 3-5 cm. longa, 1.5-4 cm. lata; venatio subobscura venae laterales costa media angulo 40-50° divergentes, vena intramarginalis margine crenulato remota. Umbellae axillares, 3-9-florae, pedunculi graciles, compressi, 4-7 mm. longi; gemmae pedicellatae, ovoideo-rostratae, subglaucae, glandulares, 5 x 6 mm.; calyx campanulatus; operculum hemisphaericum, apiculatum vel rostratum, 2-3 mm. longum, 2-3 mm. latum; antherae versatiles, ovatae, rimis parallelis dehiscentes. Fructus brevipedicellatus, campanulatus, 5 x 4 mm., discus annulum parvum circum capsulam quadrivalvularem inclusam formans.

A small somewhat glaucous tree, 20-30 feet high, and 6 inches in diameter. Bark thin, lead coloured or grey-brown, with horizontal bars of white markings. Timber pale, rather soft, open grained, tough and fibrous. Mature leaves opposite, sessile, stem-clasping to shortly petiolate, orbicular, cordate to cordate-lanceolate, green and shining above, glaucous beneath, the margins crenulate, 3-5 x 1.5-4 cm.; the venation rather fine and somewhat obscure, lateral veins few, irregular, branched towards the top, diverging at an angle of 40-50° to the midrib, intramarginal vein distant from the crenulate margin. Internodes glaucous, rough with prominent oil glands. Umbels axillary, 3-9 flowered; peduncles slender, flattened, glandular, 4-7 mm. long; buds shortly pedicellate, ovoid-rostrate, subglaucous, very glandular, 5-6 x 4 mm.; calyx campanulate; operculum hemispherical—apiculate or rostrate, 2-3 x 2-3 mm.; filaments white, flattened; anthers versatile, ovate, opening in parallel slits. Fruit shortly pedicellate, campanulate or somewhat ovate, truncate, 5 x 4 mm., the disc forming a small slightly thickened ring around the enclosed 4-valved capsule, orifice broad.

"A small scrubby tree 20-25 feet high, growing in swampy country in the Acheron Valley, near Buxton, Victoria." Miss E. E. Pownall per W. A. W. de Beuzeville, 8/1938, the type. "A small tree 25-30 feet high, and 6 inches in diameter, covering several acres of wet marshy ground near Narbethong," through Melbourne Herb., May, 1938.

First attention was drawn to this tree by Mr. Maurice Keppel and specimens were subsequently collected by Miss Joan Anderson. The species is near *E. Kruseana,* F.v.M., and *E. cordata. Labill.* in sub-series Isophyllae. From the former it differs in the larger, cordate-lanceolate, petiolate leaves, more flowers in the umbel, rostrate operculum, and in the smaller campanulate fruits, and from *E. cordata* in the smaller petiolate leaves, multi-flowered umbels, and much smaller buds and fruits.

It is a small ornamental species, with somewhat silvery foliage and rather numerous white flowers, and it should make an attractive garden plant for temperate and subalpine regions. It flowers September to October, or perhaps earlier or later.

Eucalyptus Forthiana Blakely, sp. nov., "Monkerai Box." Arbor 60—100 pedes (ca. 18.3-31 m.) alta; cortex trunco griseo-brunneus, squamosus vel subtessellatus, rami leves, lignum brunneum. Folia matura alterna, petiolata, angusto-lamceolata vel falcato-lanceolata, atroviridia, 10-15 cm. longa, 1.5-2.5 cm. lata; venatio obscura, venae laterales a costa media angulo 30-35° divergentes, vena intramarginalis margini proxima. Inflorescentia terminalis, corymbosa vel paniculata, 3-12 cm. longa; gemmae pedicellatae, cylindroideae, 10-12 mm. longae, 5-7 mm. latae; operculum acutum usque ad formam subrostratam, calycis tubo infundibuliformi aequilongum; filamenta numerosa; antherae reniformes vel globulares. Fructus pedicellatus, campanulatus vel turbinatus 5-8 mm. longus, 5-6 mm. latus, discus parvus, annularis, capsula 4-locularis, valvae inclusae vel earum apices exserti.

A tall tree, 60-100 feet high (18-30 m.), bark on trunk greyish-brown, scaly or somewhat tessellated, without conspicuous ridges or corrugations, slightly impregnated with kino, moderately thick and short-grained; branches covered with a smooth, almost white bark. Timber dark brown when fresh, the heartwood drying a lighter brown, somewhat coarse-grained, hard, tough and strong; sapwood thick, hard, greyish-white when dry. On the whole, it possesses all the features of being a good serviceable timber of the Box or Ironbark type.

Mature leaves alternate, petiolate, narrow lanceolate to falcate-lanceolate, acuminate, gradually tapering into the long subangular petioles, dark green on both surfaces when fresh, drying a dull grey colour, 10-15 x 1.5-2.5 cm., or larger; petioles 20-25 mm. long; venation very fine, somewhat obscure, the lateral veins diverging at an angle of 30-35° from the midrib; intramarginal vein very close to the edge. Inflorescence terminal, somewhat corymbose to paniculate, 3-12 cm. long, the umbels 3-7 flowered. Buds pedicellate, cylindroid, often tipped with the remains of the outer operculum, 10-12 x 5-7 mm.; operculum conical, acute to sub-rostrate, as long as the funnel-shaped calyx-tube, staminal ring rather broad; filaments numerous, all fertile; anthers reniform to globular, opening in round pores; nectary deep.

Fruit pedicellate, campanulate to turbinate when ripe, urceolate when unripe, moderately thick, 5-8 x 5-6 mm.; disc small, annular, encircling the wide orifice; capsule 4-celled, valves enclosed or the tips slightly exceeding the disc. Seeds dark brown, dull, oblong, ovate, to boat-shaped, smooth or with 3-4 transverse corrugations, slightly exceeding 1 mm. in length, about ½ mm. broad, the hilum usually inserted in the shallow cavity towards the thick end of the long seeds, central in the short seeds. Sterile seeds reddish-brown, much smaller than the fertile ones, and uniformly granular. Kino almost jet-black, breaking with a bright fracture. N.S.W.:—Lower Monkerai P. Forth, and W. F. Blakely 22/3/1938, the type. "There seems to have been a lot of these trees about Brookfield district, between Dungog and Raymond Terrace, and I have seen odd ones nearly all through this part of the coast, Gloucester, Stroud and around Karuah, Clarence Town and Ward's River," P. Forth.

It partakes of the characters of *E. hemiphloia* and *E. hybrida,* and differs from the former in the nature of the bark, timber, foliage and inflorescence, and from the latter in the bark, timber, fruits and anthers.

The scaly bark, brown timber, and the particularly large terminal inflorescence, which is reminiscent of the Bloodwoods are special features of the tree. It blooms January to March, and the flowers possess deep nectaries, and the species should rank as a heavy yielder of nectar. The pollen is very fine and white.

Named in honour of the discoverer, the late Mr. Percy Forth, Apiarist, Lower Monkerai. Mr. Forth was a very keen tree observer and he possessed the natural gift of distinguishing the various species of Eucalypts in the field as accurately as a trained botanist.

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Variation in *Cynodon Dactylon* Rich. and *Cynodon Incompletus* Nees.

D. O. Cross, B.Sc. Agr.

The two species *Cynodon Dactylon* Rich. and *Cynodon incompletus* Nees are of considerable economic importance in New South Wales. The former is one of the principal pasture grasses of the State and the latter, although less common, is of great importance where it does occur owing to its reputation as a grass causing Hydrocyanic acid poisoning in stock.

Reports of poisoning have for some time been rather conflicting and feeding tests have also given rather variable results in this State.

An interesting point is now raised as to the possibility of morphologic or even physiologic forms of these two species which may explain the variability of results obtained to date.

It has been found that *Cynodon incompletus* material examined at the National Herbarium has shown variation in morphological characters some of which are merely variations of degree, but others are of a more definite character. As an example one form shows an inflorescence of rather short spikes about 3.5 cm. long, with spikelets rather plump 2.25 mm. long x 1.25 mm. wide, and a somewhat obtuse apex, with the outer glume more than half the length of the spikelet fairly broad and showing a somewhat membraneous margin, and finally with an abundance of hairs at the leaf collar and on the leaves themselves. Another form shows rather long spikes in the inflorescence about 5.5 cm. long with spikelets rather slender 3 mm. long x 1 mm. wide and a rather acute apex, with the outer glume less than half the length of the spikelet and not showing a membraneous margin and finally very few hairs at the leaf collar or on the leaves themselves. There is also a difference in general habit and colour of these two forms. These characters shown are the more or less typical of the variables although other forms show the characters correlated in a different way.

Similar variable characters have been observed in *Cynodon Dactylon* and an additional character which is constant in individual plants, but varying in the different forms is the length and structure of the rachilla prolongation.

It is felt that insufficient material has been examined as yet to draw any definite conclusions, but it is suggested that an ultimate correlation may be found between certain forms and the results of stock feeding tests. The problem may be somewhat complicated, however, by variability in the glucoside content due to seasonal changes or to different stages in maturity of the plants.

Sydney: Thomas Henry Tennant, Acting Government Printer—1939.

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A Revision of the Australian Species of *Deyeuxia* Clar. ex Beauv., with Notes on the Status of the Genera *Calamagrostis* and *Deyeuxia*.

JOYCE W. VICKERY, M.Sc.

Introduction.

The genera *Agrostis* L., *Calamagrostis* Adans. and *Deyeuxia* Clar. ex Beauv. have, in the past, been separated almost entirely on artificial characters, which careful study has frequently revealed to be of little systematic value. Consequently, various interpretations have been made of the limits of each genus. The name *Agrostis* has usually been confined to species in which the hairs at the base of the lemma are absent or very short and the rhachilla is not or scarcely prolonged beyond the floret. *Calamagrostis*, on the other hand, has been described as possessing long hairs on the callus exceeding the length of the lemma, but the rhachilla is not prolonged. *Deyeuxia* has been distinguished by the presence of a distinct, usually hairy prolongation of the rhachilla, and by the hairs on the callus usually not exceeding the lemma in length. The prolongation of the rhachilla has proved such an unsatisfactory character, often varying considerably even in the one species, that many authors have regarded *Deyeuxia* simply as a section of *Calamagrostis*. It is considered, however, that a more natural arrangement can be attained by regarding *Deyeuxia* and *Calamagrostis* as distinct genera, and attempting to classify the species on their natural relationships rather than on artificial characters, although this may make it difficult or impossible to find any single character which would invariably serve to separate the two.

Before any comparison between the genera can be made, it is necessary first to establish clearly the type species in each case around which the conception of the genus can be built. The status and limits of the genus *Agrostis* L. have recently been discussed by Philipson (1937). The present investigation of the genera *Calamagrostis* and *Deyeuxia* has revealed that a great deal of confusion surrounds their early descriptions, and the following account is given in an attempt to clarify their positions.

The Genus *Calamagrostis*.

The genus *Calamagrostis* is usually attributed to Adanson (1763, 11 p. 31) who described it thus: Ligule membraneous; panicle tapering; calyx (glumes) ovoid, without awns; corolla (lemma) without an awn. He cites no species in connection with the description. In the table on p. 530 under *Kalamagrostis* Diosk, he cites "Negil. Arab., Gramen. Scheuz. t. 3. f. 5, Arundo Lin."

Linnaeus (1753, pp. 81-82) enumerates 6 species under *Arundo*. Of these, *Arundo Donax* and *Arundo phragmites* are given by Adanson under different genera (*Arundo* and *Phragmites* respectively); *Arundo Bambos* (*Bambusa arundinacea* Schreb.) is very unlikely to have been the species that Adanson had in mind, having a many-flowered spikelet, and *Arundo arenaria* is the type species of the genus *Ammophila* Host. Two species, *Arundo epigeios* and *Arundo Calamagrostis* remain.

Under *Arundo Calamagrostis* Linnaeus cites Scheuch. gram. 122. t. 3. f. 5, *i.e.,* the same figure in Scheuchzer as that given by Adanson. It is probable, therefore, that if Adanson had any particular one of Linnaeus species in mind, it would be this.

A comparison of Linnaeus' description and citation under *Arundo Calamagrostis* with Scheuchzer (Agrostographia, 1719) shows that Linnaeus made an erroneous citation. On p. 122 of Scheuchzer a species is described and reference is made to Tab. 3, Fig. 3, B. On p. 127 another species is described and reference made to Tab. 3, Fig. 5, A. It is obvious then that either the number of the figure or of the page was incorrectly given by Linnaeus The description given by Linnaeus, however, obviously relates to the species described on p. 122, of which it is an exact copy. Consequently, one must infer that Linnaeus intended to cite Fig. 3, not Fig. 5. Figure 3 consists of 4 drawings, which Linnaeus does not specify, but as his description is identical with that of Scheuchzer on p. 122, it is reasonable to assume that he would have intended the figure referred to there by Scheuchzer, *i.e.,* Fig. 3, B.

As far as can be made out from Scheuchzer's very inadequate diagrams, Fig. 5A and B. represent species of *Agrostis.* The spikelets are 1-flowered, and the lemmas show no signs of any hairs on the callus or of any awn, and no mention is made of these characters in the descriptions connected with these diagrams. On the other hand, Fig. 3 consists of 4 diagrams representing species with 1-flowered spikelets, but in which the hairs from the callus equal or exceed the length of the lemma. The diagrams are not sufficiently clear to decide whether the lemma is awnless or whether it has a minute awn close to the apex and concealed by the hairs of the callus. The presence of long hairs on the callus agrees with *Arundo Calamagrostis* L. and with the present day interpretation of the genus *Calamagrostis.*

It is possible to interpret the intentions of Adanson in two ways. He may have intended to base his genus *Calamagrostis* upon *Arundo Calamagrostis L.*, and have copied the incorrect reference to Scheuchzer from Linnaeus, or he may have intended to base it upon the Tab. 3, Fig. 5 of Scheuchzer, in which case the reference to Linnaeus was probably made on account of the erroneous citation by Linnaeus. Adanson evidently saw Scheuchzer's work (See Adanson, 1763, I. p. lxxxiii) as he gives a short criticism of his arrangement, so one must assume that he would refer directly to that work. Consequently, it seems more likely that he did, in fact, intend to base the genus *Calamagrostis* upon the two diagrams of Tab. 3, Fig. 5.

Little light is thrown upon the problem by Adanson's description. The membraneous ligule is shared equally by the genera *Agrostis* and *Calamagrostis.* The tapering panicle could apply to either genera. His application of the word "ovoid" to the glumes is difficult to understand, as he uses it in connection with many other known species to which it could not be applied in the sense which it now conveys. The absence of awns on the glumes could apply to either genera, or to either figure given by Scheuchzer. Mention of the awnless lemma suggests the *Agrostis*-like diagram shown in Tab. 3, Fig. 5, which he cites, but might equally apply to the specimen figured in Tab. 3, Fig. 3 (*Arundo Calamagrostis* L.) in which a minute awn may have been concealed and consequently overlooked.

Adanson's reference to Negil. Arab. has not been traced.

Adanson cites Dioscorides as the author of *Kalamagrostis.* Sprengel (1830, p. 588) states that the *Kalamagrostis* of Dioscorides is *Calamagrostis epigeios* Roth, and refers to the illustrations of Lobel in "Adv. p. 3 and Ic. t. 6."

In the Stirpium Adversaria Nova (1570) p. 3, Lobel gives a description of "Calamagrostis vel Harundinaceum," which is, however, of little value for its identification. In the Stirpia Historia (1576) p. 12, he figures a "Calamagrostis," referring to his Adversaria, p. 3. This figure shows a grass with numerous florets in each spikelet, possibly a *Bromus* sp. or *Poa* sp. In the Icones Stirpium (1591) p. 6, he reproduces the same figure as a "Calamagrostis," and gives another figure which he calls "Gramen tomentosum et acerosum Calamagrostis quorundam, et vulgi Gramen plumosum" and which on general appearance might represent a species such as *Calamagrostis epigeios* Roth or *C. lanceolata* Roth. No single spikelet or dissections are shown which would enable one to draw any definite conclusions as to its identity. It is probable that Sprengel had this figure in mind when he suggested its identity as *Calamagrostis epigeios* Roth. Adanson placed his *Calamagrostis* in a section having single, hermaphrodite flowers in each spikelet, "Ils n'ont qu'une seule fleur hermaphrodite à deux bâles, renfermée dans un calice à deux bâles . . .", so that the "Calamagrostis" with the many-flowered spikelet figured by Lobel could not have had any connection with the genus as intended by Adanson.

It is impossible to identify the "Kalamagrostis" of Dioscorides from the short description given. It is not even certain whether the figure which accompanies the description in the Codex Aniciae Julianae, added by a Byzantine artist about A.D. 512, is, in fact, the same species as that described by Dioscorides himself during the first century A.D., and in any event it is almost useless for identification. It shows no inflorescence, and the habit indicates a creeping plant, but whether a grass or a plant belonging to some other family such as the Polygonaceae it seems impossible to determine. In Gunther's (1934) English translation of the Greek Herbal of Dioscorides (p. 427), "Kalamagrostis" is identified with *Cynosurus Egyptica,* but the resemblance is not great and there appears insufficient evidence to confirm this. Little assistance therefore, can be obtained from a study of pre-Linnean works in ascertaining the intentions of Adanson in describing the genus.

Hitchcock (1936) has accepted *Arundo Calamagrostis* L. as the type species of *Calamagrostis* Adans., accepting Adanson's reference to Linnaeus. The balance of evidence, however, suggests that *Calamagrostis* Adans. must be based on the two diagrams in Scheuchzer on Tab. 3, Fig. 5. If this is so, then *Calamagrostis* Adans. is probably synonymous with *Agrostis* L. For many years, however, the conception of *Calamagrostis* has been built up around such species as *C. epigeios* Roth (*Arundo epigeios* L.) and *C. lanceolata* Roth (*Arundo calamagrostis* L.). To adopt the conception that *Calamagrostis* is synonymous with *Agrostis* would cause many unfortunate and unnecessary changes in nomenclature.

On account of the uncertainty surrounding Adanson's description of *Calamagrostis,* some authors (*e.g.,* Stapf, 1899, p. 550) have accepted Roth as the author of the genus.

Roth (1788, p. 33) describes the genus as "Gluma bivalvis, uniflora. Corolla basi pilosa," and enumerates five Linnean species under the genus. No combinations under *Calamagrostis* pre-date Roth's work, so that in the interests of stability of nomenclature the desirability of conserving *Calamagrostis* Roth against *Calamagrostis* Adans. might well be considered. If this be done, then a type species must be selected from amongst those enumerated by Roth under the genus *Calamagrostis.* The first, *Calamagrostis Arundo,* is based on *Agrostis Calamagrostis* L., which has become the type of *Lasiagrostis* Link, so that it is unsuitable for selection. The last, *Calamagrostis arenaria,* based on *Arundo arenaria* L., is the type species of the genus *Ammophila* Host, so is also unsuitable. Of the remaining three, *Calamagrostis arundinacea* (*Agrostis arundinacea* L.) *C. lanceolata* (*Arundo Calamagrostis* L.) and *C. epigeios* (*Arundo epigeios* L.), the last two appear to agree best with Roth's description "corolla basi pilosa," and, in fact, to typify the present conception of the genus. Since either would serve equally well, therefore, it is proposed that *Calamagrostis lanceolata* Roth be selected as the type species, as this would best agree with Hitchcock's (1936) conclusions although these were apparently based on incomplete data.

The epithet *Calamagrostis* was also used by Gmelin (1791, p. 171-2) in the sense in which it is now defined, *i.e.*, to include *C. lanceolata* Roth and *C. epigeios* Roth.

The Genus *Deyeuxia*.

The genus *Deyeuxia* was first described by Beauvois (Agrostographie, 1812, p. 43), following a manuscript name attributed to Clarion. Beauvois cited 4 species under the genus, thus: "*Arundo Sedenensis, acutiflora* Willd., *Airoides* Mich., *montana* Gaud." It has been pointed out by Niles and Chase (1925, p. 169) that *Deyeuxia montana,* the first of the two species figured (though inaccurately) by Beauvois (Pl. ix. Fig. ix) must be taken as the type of the genus, and the others eliminated.

Arundo acutiflora was ascribed by Beauvois to Willdenow, but Willdenow (1809 p. 127) cites Schrader (1806, p. 217) as the author of this species. Ascherson and Graebner (1899, p. 219) regarded it as a hybrid between *Calamagrostis arundinacea* Roth and *C. epigeios* Roth. It would be unsatisfactory, therefore, to maintain *D. acutiflora* as the type species of *Deyeuxia.*

According to Niles and Chase (1925) *Deyeuxia airoides* Beauv. is probably intended for *Trisetum melicoides* (Michx.) Scribner.

Deyeuxia montana Beauv. is based on *Arundo montana* Gaud. (1811), which is, however, an illegitimate synonym of *Arundo varia* Schrad. (1806). [*Calamagrostis varia* (Schrad.) Host, and *Deyeuxia varia* (Schrad.) Kunth], a common European species. This species may reasonably be accepted as the type of *Deyeuxia.*

Arundo sedenensis is ascribed to "Decand." by Beauvois (1812, p. 153), but as this combination was not made by De Candolle, it is probably intended for *A. sedenensis* Loisel. (1807), which is usually regarded as a synonym of *Calamagrostis varia* (Schrad.) Host, and *Deyeuxia varia* (Schrad.) Kunth.

Comparison of *Deyeuxia* with *Calamagrostis.*

Considerations as to the desirability or otherwise of maintaining *Deyeuxia* as a genus distinct from *Calamagrostis* must, therefore, be based primarily on a comparison of the species *Deyeuxia varia* Kunth and *Calamagrostis lanceolata* Roth, and on the extent to which these two species typify distinct groups. In actual fact, certain differences do exist between them which seem sufficient to justify the maintenance of *Deyeuxia* as a separate genus, and the problem then arises as to the limits to be accorded to each genus, and the features which must be regarded as the most significant criteria for their separation.

Bentham and Hooker (1883) regarded the three genera *Agrostis, Calamagrostis* and *Deyeuxia* as distinct, though under *Deyeuxia* (p. 1153) they remarked that some species appear intermediate between *Deyeuxia* and *Calamagrostis,* while other species approach *Agrostis.*

Hackel (1896) reduced *Deyeuxia* to the status of a section of *Calamagrostis,* and his proposal has been largely followed by more recent authors, *e.g.,* Hitchcock (1935 and 1936). Hitchcock placed the American species in *Calamagrostis,* but stated that they all belong to the section *Deyeuxia.*

Stapf (1899, p. 550) restricted the genus *Calamagrostis* to northern hemisphere species, except for *C. epigeios* Roth, which extends from the northern hemisphere southwards across the mountains of tropical Africa to South Africa.

The unsatisfactory nature of the usual characters employed to distinguish these genera has been emphasised by Hooker (1897, p. 253), and he was evidently unable to apply these differences strictly when grouping the species.

The degree of prolongation of the rhachilla is entirely unsatisfactory as a generic character. Although useful as a specific character in some cases, in others it is found to vary within a single species. For example, in *Deyeuxia monticola* (Roem. & Schult.) n. comb. it may range from short and glabrous to long and hairy, and occasionally bears a second well-developed lemma in different spikelets of the one panicle. Even in some indisputable species of *Calamagrostis* such as *C. epigeios* Roth, the rhachilla is sometimes prolonged, and occasionally also in some species of *Agrostis.*

An examination of a large number of species of all three genera has shown that the nature of the lemmas and glumes provides more reliable characters on which the closely allied species may be segregated.

Calamagrostis (as exemplified by *C. lanceolata* Roth) and *Agrostis* both have very thin, hyaline lemmas, those of *Agrostis,* furthermore, being very broadly truncate at the apex. *Deyeuxia varia* Kunth, on the other hand, and numerous other species which appear to belong to the genus *Deyeuxia*, have the lemma thinly to rather strongly indurated, and usually more or less densely scaberulous. Species of *Calamagrostis* have very long, narrow, acuminate glumes, with a relatively short lemma, and the hairs of the callus usually much exceed the lemma. Species of *Deyeuxia* have relatively shorter and broader glumes, less prominently exceeding or even slightly shorter than the lemma, and the hairs on the callus are seldom as long as the lemma.

The application of these characters rather than those of the rhachilla appears to make for a relatively natural grouping within the complex. *Calamagrostis* would then be almost entirely a northern hemisphere genus, while *Deyeuxia* occurs in both hemispheres.

As no species of *Calamagrostis* in the strict sense occur in Australia, the difficulties enumerated by Black (1919, p. 26) as to the means of distinguishing between *Deyeuxia and Calamagrostis* in Australia do not apply.

The Australian species which have variously been placed in *Agrostis, Deyeuxia* and *Calamagrostis* include species both of *Agrostis* and *Deyeuxia.* The following enumeration is concerned only with those which are regarded as belonging to the genus *Deyeuxia.* It is hoped that a subsequent paper will deal with those belonging to the genus *Agrostis.* In the Flora Australiensis, Bentham (1878) cited fifteen species under *Deyeuxia.* Of these five species, *D. aequata* (Nees) Benth., *D. Forsteri* (Roem. and Schult.) Kunth, *D. Drummondiana* (Steud) Benth., *D. Billardieri* (R. Br.) Kunth and *D. plebeia* (R. Br.) Benth. are regarded by the writer as belonging to the genus *Agrostis* on account of their broadly truncate, hyaline lemmas. *D. cylindrica* (R. Br.) Benth. is regarded as a variety of *D. quadriseta* (Labill.) Benth. *D. breviglumis* Benth is regarded as synonymous with *D. Gunniana* Benth. A number of species sunk as synonyms by Bentham are again raised to specific rank. Certain other changes in nomenclature have been found necessary as a result of the application of the international rules of botanical nomenclature, and of the comparison of certain type specimens with Bentham's material. It has been found necessary to describe seventeen new species.

The existence of numerous undescribed species in Australia has probably increased the confusion surrounding the identity of the known species. Thus Maiden and Betche (1899, p. 152) and Ewart (1907, p. 13) comment on the unreliability of the various characters used for the separation of the species. These comments may have been aroused chiefly by an examination of more than one species then included under the one name. It is hoped that the present enumeration may remove some of these difficulties, though it is probable that the limit of the genus in Australia has not yet been reached, as comparatively few collections have been made of this neglected group.

The species are more or less montane in distribution, occupying open forest, and are not common in grazing country.

In the following enumeration, the location of the type specimen is indicated after the word Type as follows: C. Botany School, Cambridge; K. The Royal Botanic Gardens, Kew; B.M. The British Museum of Natural History; S. The National Herbarium, Sydney. All the specimens cited have been examined by the writer.

Enumeration and Descriptions of Species.

1. *Deyeuxia Lawrencei* n. sp.

Gramen erectum, caespitosum, subglabrum, perenne 50-60 cm. altum; culmi validiusculi, rigidi, circa 3-nodis; internodi vaginas excedentes, striati, inter nervos scaberuli; nodi glabri; vaginae tandem supra laxae, plus minusve laeves; ligulae membranaceae, 2-5 mm. longae, obtusae, plus minusve fissidentes; laminae 4-15 cm. x 1. 5-4 mm., planae vel in sicco laxe involutae, lineares, acuminatae, tenuiter sulcatae, marginibus scabridis et nervis parum scabridis; panicula cylindrica, densa, 9 cm. x 1 cm., spiculis imbricatis; rami breves, multitudines, appressi, breviores spiculas 5 mm. ab basis ferentes, longiores ad 1 cm. ab basis nudi; rhaches ramique dense scabridi; internodus inferior paniculae circa 1 cm. longus; pedicelli 1-3 mm. longi, scabridissimi; spiculi circa 8 mm. longi, valde laterale compressi; glumae angustae, acutissimae, viridiusculae vel purpurascentes, ad marginas scariosae, 1-nerves, valde carinatae, carinis scabridissimis, lateribus minute scaberulis, divergentes, inaequales, inferior longior; lemma glumis multo brevius, circa 5 mm. longum ambitu lanceolatum, truncatum et summa manifeste 4-dentatum, tenuiter sed densissime scaberulum, supra manifeste 4-nerve, setam posteriorem prope basem ferens; seta quam lemma bis longior, exserta, geniculata, infra contorta; callus breve sed dense barabatus, pilis brevibus, tenuibus 0.1-0.5 mm., longis; palea quam lemma brevior, tenuis, membranacea, angusta, 2-carinata, carinis minute scaberulis supra, angustissime truncata, minute et obscure ciliolata summa; rhachilla o vel minutissima; antherae 3, circa 1.4 mm. longae.

Loc: Tasmania: Van Diemen's Land, without exact locality, R. W. Lawrence, No. 12, circa 1831 (Type K).

Erect, tufted, subglabrous perennial, 50-60 cm. high; culms rather stout, stiff, about 3-noded, the internodes exceeding the sheaths, striate, scaberulous between the veins; nodes glabrous, sheaths becoming loose above, more or less smooth; ligule membraneous, 2-5 mm. long, obtuse, rather jagged, laciniate; blade 4-15 cm. x 1.5-4 mm., flat or loosely inrolled when dry, linear, acuminate, shallowly grooved, scabrous on the margins and slightly scabrous on the veins; panicle cylindrical, dense, 9 cm. x 1 cm., the spikelets imbricate on short, clustered, appressed branches, the shorter ones bearing spikelets 5 mm. from their bases, the longer ones bare for up to 1 cm.; rhachis and branches densely scabrous, the lowest internode about 1 cm. long; pedicels 1-3 mm. long, very scabrous; spikelets about 8 mm. long, strongly laterally compressed; glumes narrow, very acute, greenish or purplish, scarious towards the margins, 1-nerved, strongly keeled, very scabrous on the keels, minutely scaberulous on the sides, gaping, unequal, the lower glume the longer; lemma much shorter than the glumes, about 5 mm. long, lanceolate in outline, truncate and distinctly 4-toothed at the apex, finely but very densely scaberulous, 4-nerved, the nerves rather conspicuous towards the apex, with a dorsal awn attached near the base; awn nearly twice as long as the lemma, exserted, geniculate, twisted in the lower part; callus shortly but densely barbed with short, fine hairs 0.1-0.5 mm. long; palea shorter than the lemma, thin, membraneous, narrow, 2-keeled, minutely scaberulous on the keels in the upper part, very narrowly truncate and minutely and obscurely ciliolate at the apex; rhachilla not or scarcely produced; anthers 3, about 1.4 mm. long.

2. *Deyeuxia Drummondii* (Steud.) n. comb.

Syn: *Pentapogon Drummondii* Steud. Syn. Pl. Gram. I. p. 193 (1854).

Loc.: Western Australia: Swan River to Cape Riche, Drummond (5th coll.) No. 448.

Small, decumbent, glabrous annual, 5-25 cm. high; culms slender, 2-3-noded, the internodes shortly exceeding the sheaths; sheaths appressed, or slightly loose at the top, smooth; ligule membraneous, 2-3.5 mm. long, jagged at the apex, laciniate smooth; blade flat, linear, acuminate, 1-8 cm. x 1-1.5 mm., fairly smooth; panicle oblong to narrow-oblong, 1.5-4 cm. x 0.7-1 cm., with loosely imbricate spikelets born on short, appressed, glabrous or scaberulous branches, the lower internode about 8 mm. long; pedicels sub-clavate, 1-3 mm. long, very finely and sparsely scabrous, spikelets 7-8 mm. long, greenish or purplish, strongly laterally compressed; glumes unequal, the lower glume about 1 mm. longer than the upper, 1-nerved, keeled, scabrous on the keel, very sparsely and finely scaberulous on the sides, greenish towards the centre, scarious and faintly purplish towards the margins, acuminate, rather widely gaping; lemma about 3.5 mm. long, distinctly 4-toothed at the apex, distinctly and closely scaberulous but slightly furrowed and smooth between the veins just below the apex, 4-nerved above the middle, the nerves conspicuous, with a dorsal awn attached about 1 mm. from the base, furrowed above the awn; awn 4-5 mm. long, strongly exceeding the lemma but not exceeding the glumes, geniculate, twisted in the lower part; callus shortly barbed with hairs 0.2-0.6 mm. long; palea shorter than the lemma, thin, membraneous, 2-keeled, minutely scaberulous on the keels in the upper part, narrowly truncate, minutely 2-fid and finely ciliolate at the apex; rhachilla not or scarcely produced; anthers 3, 0.7-1 mm. long.

Bentham (Fl. Austral, vii, p. 582, 1878) incorrectly identified this species with *Deyeuxia cylindrica* (R.Br.) Benth.

3. *Deyeuxia inaequalis* n. sp.

Gramen erectum, caespitosum, subglabrum, anuum(?), circa 75 cm. altum; culmi tenuisculi, 3-4-nodis, internodiis vaginas excedentibus, laevi sed parum scaberuli inter nervos; nodi subglabri; vaginae ad culmos appressae vel interdum tandem summa laxae, striatae, laeves sed scaberulae inter nervos; ligulae membranaceae, truncatae et laciniatae, laeves vel procul scaberulae, 3-5 mm. longae; laminae lineares, 5-12 cm. x 1-3 mm., acutae, margine scaberulae; panicula anguste oblonga, densa; rhachis scabrida, spiculis dense imbricatis teeta; rami breves, scabridi, appressi, condensati; pedicelli circa 0.2 mm. longi, scabridi; internodus inferior paniculae circa 3 mm. longus; spiculae 5-6 mm. longae, valde laterale compressae; glumae angustae, acuminatae, inaequales, inferior longior, 1-nerves, carinatae, carinis scabrissimis, laterale minute scaberulae, virescentes ad mediam, scariosae ad margines, aliquantum divergentes; lemma sub bis brevius glumis, circa 2.4 mm. longum, ambitu plus minusve lato-lanceolatum, truncatum et breve 4-dentatum supra, crasse sed remote scaberulum, aliquantum tenue, parum induratum, membranaceum supra inter nervos, 4-nerve, setam dorsam ad basem ferens; seta 3.5-4.5 mm. longa, lemma excedens, obscure exserta, parum contorta subter, geniculata; callus brevissime et tenuiter barbatus pilis paucis circa 0.1-0.2 mm. longis; palea lemmaque subaequalis; palea tenuissima, aliquantum acuta vel minute 2-fida ad apicem, 2-carinata, carinis minute scaberulis supra; rhachilla o vel brevissime producta, glabra; antherae 3, circa 1 mm. longae, anguste oblongae.

Loc.: Western Australia: Arnolds, W. M. Carne, 20.12.1923 (Type. K.); Nannup via Balingup, A. McKettrick, Jan. 1909; Deep River, S. W. Jackson, 12.1912.

Erect, tufted, subglabrous, annual (?), about 75 cm. high; culms rather slender, 3-4 noded, the internodes exceeding the sheaths, slightly scaberulous between the veins, smooth to the touch; nodes subglabrous; sheaths appressed to the culms or sometimes becoming loose in the upper part, striate, scaberulous between the veins, smooth to the touch; ligule membraneous, truncate and jagged, smooth or sparsely scaberulous, 3-5 mm. long; blade linear, 5-12 cm. x 1-5 mm., acute, scaberulous on the margins; panicle narrow oblong, dense, not lobed, the rhachis scabrous, concealed by the densely imbricate spikelets born on short, scabrous, appressed, condensed branches, the pedicels about 0.2 mm. long, scabrous; lowest internode about 3 mm. long; spikelets 5-6 mm. long, strongly laterally compressed; glumes narrow, acuminate, unequal, the lower glume the longer, 1-nerved, keeled, very scabrous on the keels, minutely scaberulous on the sides, greenish towards the centre, scarious towards the margins, somewhat gaping; lemma less than half as long as the glumes, about 2.4 mm. long, rather broad lanceolate in outline, truncate and shortly 4-toothed at the apex, coarsely but rather sparsely scaberulous, rather thin, not greatly indurated, membraneous towards the apex between the nerves, 4-nerved, with a dorsal awn attached near the base; awn about 3.5-4.5 mm. long, exceeding the lemma, obscurely exserted, slightly twisted in the lower part, geniculate; callus very shortly and sparsely barbed with a few hairs about 0.1-0.2 mm. long; palea subequal to the lemma, very thin, rather acute or minutely 2-fid at the apex, narrow, 2-keeled, minutely scaberulous on the keels in the upper part; rhachilla not or very shortly produced, glabrous; anthers 3, about 1 mm. long, narrow oblong.

4. *Deyeuxia quadriseta* (Labill.) Benth. Fl. Austral. vii. p. 581 (1878).

Syn.: *Avena quadriseta* Labill. Pl. Nov. Holl. i. p. 25, t. 32 (1804); *Agrostis quadriseta* (Labill) R.Br. Prod. p. 171. (1810); *Calamagrostis quadriseta* (Labill) Spreng, Syst. Veg. i. p. 253 (1825); O. Kunze Rev. Gen. Pl. III ii. p. 343 (1898); *Bromidium quadrisetum* (Labill.) Nees in Hook. Lond. Journ. Bot. ii. p. 416. (1843); *Agrostis lobata* R. Br. Prod. p. 171, (1810); *Vilfa lobata* (R.Br.) Beauv. Agrost, p. 16 (1812); *Bromidium lobatum* (R.Br.) Nees in Hook. Lond. Journ. Bot. ii. p. 415 (1843); *Agrostis quadriseta* var. *lobata* (R.Br.) Hook. f. Fl. Tas. ii. p 114 (1860); *Agrostis quadriseta* var. *paniculata* Hook f. l.c.; *Agrostis diaphora* Trin. Mem. Acad. Imp. Sci. St.-Petersb. Ser. VI. Bot. vol. VI, ii (1840) p. 366.

Very variable, erect, tufted, subglabrous perennial, 15-120 cm. high; culms rather slender to rather robust, 3-4-noded, the internodes exserted from the sheaths, striate, more or less scaberulous between the veins; nodes glabrous; sheaths striate, sometimes scaberulous, often becoming loose towards the top; ligule membraneous, broadly ovate, obtuse, laciniate, minutely scaberulous, 4-7 mm. long; blades flat or loosely involute, acute or acuminate, linear, 10-25 cm. x 2.5-7 mm., deeply chanelled on the upper surface, more or less scabrous on both sides and on the margins; panicle very dense, usually linear or very narrow oblong, sometimes lobed, or rarely sub-pyramidal with spreading branches; branches short, usually appressed, densely clustered, mostly divided and bearing spikelets almost to their bases; pedicels 0.5-3 mm. long; rhachis scaberulous, branches and pedicels scabrous; spikelets 3-6 mm., usually 4.5-5.5 mm. long, rather strongly laterally compressed; glumes narrowly gaping, unequal, the lower glume the longer, acute or acuminate, rather narrow, 1-nerved, keeled, scabrous on the keels, minutely scaberulous on the sides, greenish near the centre, whitish, scarious to hyaline towards the margins; lemma much shorter than the glumes, rather narrow lanceolate, distinctly 4-toothed at the apex, sometimes only inconspicuously and very minutely scaberulous, at other times distinctly and densely scaberulous, slightly to rather strongly indurated, 4-nerved, with a dorsal awn attached slightly above the base; awn twisted in the lower part, geniculate, much exceeding the lemma, exserted; callus shortly barbed with hairs 0.2-0.7 mm. long; palea shorter than the lemma, very thin, membraneous, narrowly truncate, minutely and obscurely bifid at the apex, rather narrow, 2-keeled; rhachilla not or scarcely produced; anthers 0.5-2 mm. long.

This widely distributed species shows a large number of forms, only one of which is recognised as a distinct variety in the present work. The others cannot readily be defined as varieties, as the forms grade into one another, and probably interbreed freely. In some cases, different forms of the panicle may be shown at different stages of development. Anther size and the degree of scaberulousness of the lemma vary considerably in the different forms. An attempt has been made below to group the closely allied specimens together, with notes on their chief distinguishing features.

Form. A.—Culms 50-120 cm. high; panicle scarcely lobed, 10-15 cm. long; lemma very thinly indurated, very minutely and inconspicuously scaberulous; anthers 0.5-0.8 mm. long.

Loc.: New South Wales: Armidale, Parrot; Forest Creek, F. Mueller; Parramatta, Woolls; Georges River, Herne Bay, J. Vickery, No. 102 in part, 9.11.1930; Jervis Bay, F. A. Rodway, 21.10.1928; without exact locality, J. N. Whittet, No. 2, 1931.

Victoria: Acheron Way, J. Vickery, 19.1.1935; near Ringwood, C. E. Hubbard, No. 8529, April, 1931.

Tasmania: Port Dalrymple, R. Brown, No. 6213; Lenah Valley, Hobart, A. H. S. Lucas, December, 1924, No. K. 53.

Form B.: Very close to the preceding, but the lemma rather more definitely scaberulous, and the anthers about 1.2-1.5 mm. long.

Loc.: New South Wales: South Guyra, 4300 feet, Rev. E. N. McKie, D, 1.12.1930; Hill Top, E. Cheel, 11.1913; Dee Why Swamps near Manly, W. M. Carne, 7.11.1914. No. K. 54.

Victoria: Gippsland, F. M. Campbell.

Tasmania: C. Stuart; Van Diemen's Land, ex herb. of Trinius (Type of *A. diaphora* Trin. at Herb. Acad. Sci. Petropol.). A specimen ex herb. Desfontaines in the Webb Herb. at Florence, which is probably part of the type collection of *Avena quadriseta* Labill., appears to belong to this form, but the spikelets show very few remaining lemmas and these are too old to contain anthers.

South Australia: Basket Range, J. F. Bailey, 29.11.1930.

Form C. Close to the preceding, but the lemma rather densely and strongly scaberulous, anthers 1.7-2 mm. long.

Loc.: New South Wales: Captain's Flat, J. N. Whittet, No. 4, 1931; Jervis Bay, Huskisson, F. A. Rodway, 25.10.1930.

South Australia: Mylor, J. F. Bailey, 26.11.1930; Inman Valley, J. B. Cleland, 25.1.1922; Encounter Bay, Bach Valley, in swamp, J. B. Cleland, 18.11.1926; Kangaroo Island, Rocky River, J. B. Cleland, 18.11.1924.

Western Australia: Tone River, wet places, Oldfield, No. 668 b; Bassendean, C. B. Palmer, 1930; Warren River, Walcot; Banks of Blackwood, Oldfield, 668.

Form D. Differs in the rather smaller spikelets (about 3-4.5 mm. long), shortly lobed inflorescence, lemma very strongly scaberulous, indurated. Anthers 0.5-1 mm. long. (This includes the type of *Agrostis lobata* R.Br.).

Loc.: New South Wales: Port Jackson, A. Kneucker, Gram. Exsicc., No. 217.

Tasmania: Port Dalrymple, R. Brown, No. 6216 (Type of *Agrostis lobata* R.Br. The lobing of the inflorescence in this specimen is most strong in panicles affected with a smut, less strong in the apparently normal panicles); South Arm, D. Martin, 10. 1934; Cambridge, roadside, D. Martin, 1. 1934.

Western Australia: Near Manjimup, H. R. Ward, 12. 1925; Big Brook, Max Koch, No. 2633, Dec., 1921. (The Western Australian specimens have a narrower, more sparse inflorescence than those from Eastern Australia.)

Form E. Small slender plant, 20-40 cm. high, with short, narrow leaves 4-10 cm. x 1.5 mm., panicle 2-6 cm. long, cylindrical; spikelets small, about 3 mm. long; lemma densely scaberulous; glumes scarcely acuminate; anthers oblong, about 0.5 mm. long.

Loc.: Tasmania: Circular Head, F. Mueller; Gunn, 11.1.1937, in part.

Form F. Leaves rather numerous from the base, long, narrow, linear, acuminate, up to 30 cm. x 1.5-2.5 mm.; panicle cylindrical or somewhat loosely lobed; lemma scaberulous as in Form D; anthers about 1.5 mm. long.

Loc.: Victoria: Wendu Vale, marsh lands, Robertson, No. 43, 11.1826; Murray, F. Mueller.

Form G. Leaves broad, acute, often short. Panicle pyramidal, with the lower branches sub-verticillate and remotely spreading or reflexed, or somewhat contracted; anthers 1,7-2 mm. long; lemma very minutely and inconspicuously scaberulous. (This includes *Agrostis quadriseta* var. *paniculata* Hook. f. l.c.)

Loc.: Tasmania: Gunn, 991; Marlboro', Gunn, No. 1489; Base of Mt. Wellington, Gunn, No. 1447, 7.1.1841; Van Diemen's Land, ex herb. of Trinius (included with type of *A. diaphora* Trin.); Domain, Hobart, A. H. S. Lucas, Dec. 1923. No. K. 52.

Form H. Panicles up to 4 cm. wide, strongly lobed or somewhat contracted; plant very stout, the culms up to 5 mm. diameter; lemma rather thin, scaberulous; anthers about 0.7 mm. long.

Loc.: New South Wales: Holbrook, J. N. Whittet, No. 3, 1931; Centennial Park, W. F. Blakely, 10, 1913, No. K. 51.

Tasmania: Gunn, No. 771.

Without locality: W. R. Guilfoyle, June, 1919.

Deyeuxia quadriseta var. *cylindrica* (R.Br.) n. comb.

Syn.: *Agrostis cylindrica* R.Br. Prod. p. 171, (1810); *Vilfa cylindrica* (R.Br.) Beauv. Agrost p. 16, (1812); *Deyeuxia cylindrica* (R.Br.) Benth. Fl. Austral. vii p. 582, (1878).

Differs in the very narrow cylindrical panicle, 4.5-8 cm. x 6-9 mm., the spikelets less densely imbricate; spikelets very slightly broader, with less acuminate glumes; culms rather slender.

Loc.: Western Australia: R. Brown, No. 6214 (Type B.M.); Swan River, Helmich, No. 56; Nannup via Balingup, A. McKettrick, Jan. 1909; Jarnadup, Miss Knox-Peden, 20.12.1918.

5. *Deyeuxia mesathera* Stapf. ms. n. sp.

Gramen perenne, caespitosum, erectum vel nodis inferioribus parum geniculatis, 80-120 cm. altum; culmi rigidiusculi, 4-5-nodis, striati, glabri, internodis vaginas excedentibus; nodi glabri; vaginae tandem ab culmis librae, manifeste striatae, glabrae; ligulae membranaceae, 2-4 mm. longae, truncatae vel serratae; laminae planae vel in sicco laxe convolutae, 8-45 cm. x 2-3 mm., lineares, ad acuminem longum acuminatum attenuatae, margine et subter scabridae, supra scabridae vel hispidae; panicula densa, contracta, aliquantum lobata, plus minusve cylindrica, 15-25 cm. x 1-2 cm.; rhachis scaberula, ramos fasciculatos adpressos scabridos ferens; fasciculi inferiores circa 5-nati; rami breviores subter 0.5-1 cm. longiores ad 3.5 cm. nudi, tum multo divisi; pedicelli 0.5-2 mm. longi, scabridissimi; spiculae ramosae circa 3 mm. longae, straminellae, latere compressae; glumae subaequalae vel inferior parum superiorem excedens, acutae, latiusculae, 1-nerves, carinatae, carinis scabridissimis, minute sed dense scaberulae ad lateres, aliquantum divergentes; lemma ambitu lanceolatum minute dentatum ad apicem anguste truncatum, glumas subaequalans, minutissime sed dense scaberulum, 5-nerve infra mediam, nervis prominentibus, setam dorsam ad vel parum supra mediam ferens; seta recta, lemma 0.5-1 mm. excedens; callus pilis tenuis 0.2-1 mm. longis barbatus; palea lemma subaequalens, 2-carinata, tenuissima, subacuta; rhachilla o vel brevissime producta; antherae circa 1 mm. longae.

Loc.: New South Wales: Centennial Park (Sydney), in swampy land, E. Cheel. 1.1901. (Type K.), and 3.12.1899; without exact locality, G. Caley, 1803, No. 2; Centennial Park, J. L. Boorman, 12.1907, No. K. 47.

Tufted perennial, erect or slightly geniculate at the lower nodes, 80-120 cm. high; culms rather rigid, 4-5 noded, the internodes exceeding the sheaths, striate, glabrous; nodes glabrous; sheaths at length free from the culm, conspicuously striate, glabrous; ligule membraneous, 2-4 mm. long, truncate or jagged, scaberulous; blades flat, or loosely convolute when dry, 8-45 cm. x 2-3 mm., linear, narrowed into a long acuminate point, scabrous on the lower surface and margins, scabrous to hispid on the upper surface; panicle dense, contracted, somewhat lobed, more or less cylindrical, 15-25 cm. x 1-2 cm., the rhachis scaberulous, bearing clusters of adpressed, scabrous branches, the lower clusters about 5-nate, the shorter branches bare for 0.5-1 cm. at the base, the longer for up to 3.5 cm., then much branched, the spikelets racemosely arranged on the ultimate branchlets; pedicels 0.5-2 mm. long, very scabrous; spikelets about 3 mm. long, straw-coloured, laterally compressed; glumes subequal or the lower glume very slightly longer than the upper, acute, rather broad, 1-nerved, keeled, very scabrous on the keels, minutely but closely scaberulous on the sides, somewhat gaping;

lemma lanceolate, minutely toothed at the narrowly truncate apex, subequal to the glumes, very minutely but densely scaberulous, 5-nerved below the middle the nerves apparent, bearing a dorsal awn attached at or slightly above the middle; awn straight, exceeding the lemma by 0.5-1 mm.; callus barbed with fine hairs up to 0.2-1 mm. long; palea almost equalling the lemma, 2-keeled, very thin, sub-acute; rhachilla not or only very shortly produced; anthers about 1 mm. long.

6. *Deyeuxia densa* Benth. Fl. Austral. vii p. 582 (1878).

Syn.: *Agrostis densa* (Benth.) F. Muell., Syst. Census of Austral. Pl. p. 133 (1882), non Bieb. (1808); *Calamagrostis densa* (Benth.) Maiden & Betche, Census of N.S.W. Plants (1916), p. 21, non Vasey, (1892); *Calamagrostis minor* var. densa (Benth.) J. M. Black, Trans. Roy. Soc. S. Austral., xliii, p. 27 (1919).

The combination *Calamagrostis densa* was incorrectly ascribed to Hackel by Maiden and Betche in the Census of N.S.W. Plants.

Loc.: New South Wales: Recorded in Maiden and Betche, l.c., but I have not seen specimens from this State.
Victoria: Wilson's Promontory, F. Mueller (selected as the Type K.).
South Australia: Lofty Ranges, F. Mueller; Crafers, 12.1883, ex Tate Herbarium.
Tasmania: R. C. Gunn; Port Arthur, J. H. Maiden, 2.1906; Cascades, Hobart, L. Rodway, Dec., 1892.

Rather small, slender, glabrous perennial (?), 30-50 cm. high; culms 3-4-noded, very slender, the internodes exceeding the sheaths; sheaths appressed at the base, becoming rather loose above; ligule membraneous, broadly ovate, obtuse or jagged, 2-4 mm. long, scaberulous; blades of the culm leaves flat or rather involute, linear, acuminate, 2-10 cm. x 1-2 mm., very slightly scabrous; panicle rather dense to somewhat loose, narrow lanceolate to subcylindrical, about 7-15 cm. x 1-1.5 cm., greenish, the spikelets produced racemosely on short, scabrous, more or less appressed branches divided almost to their bases, the lowest internode about 1-1.5 cm. long; rhachis and branches very scabrous; pedicels 0.5-3 mm. long, scabrous; spikelets 4-5.5 mm. long, laterally compressed; glumes subequal, narrowing into a long, acute or minutely mucronate tip, 1-nerved, keeled, scabrous on the keels, minutely and sparsely scaberulous on the sides, with a narrow, greenish band on either side of the keel and a broad scarious margin; lemma almost equalling the glumes, lanceolate in outline, tapering into the narrow, acute or finely toothed apex, very closely and distinctly scaberulous, 5-nerved below the middle, but the nerves rather obscure except towards the apex, with a dorsal awn placed at or slightly above the middle; awn about 5 mm. long, loosely twisted in the lower part, obscurely once or twice geniculate, much exserted; callus barbed with fine, 0.2-1 mm. hairs; palea about 0.5 mm. shorter than the lemma, thin, 2-keeled, very minutely scaberulous on the keels in the upper part, acuminate or very finely toothed; rhachilla produced into a bristle nearly 2 mm. long, bearing fine hairs up to 1.5 mm. long; anthers 0.5-1.2 mm. long, oblong.

7. *Deyeuxia appressa* n. sp.

Gramen erectum, caespitosum, perenne, circa 90 cm. altum; culmi circa 5-nodis, striati, scabri in sulcis; internodi vaginas excedentes; nodi glabri; vaginae tandem supra laxae, dense pubescentes; ligulae membranaceae, truncatae, serratae et fissidentes, 1-2 mm. longae, tenuiter sed aliquantum dense pubescentes; laminae planae vel laxe involutae, 10-30 cm. x 2-4 mm., utrinque profunde sulcatae, subter scabrae, supra dense pubescentes; panicula contracta, linearis—anguste-lanceolata, 20-30 cm. longa, lobata, plus minusve densa; rami appressi vel parum patentes, 3-4-nati, inaequales, breviores 8 mm. ab basis divisi, longiores ad 4 cm. ab basis haud divisi tum 1-2-nate

divisi; internodi inferiores panicularum ad 6 cm. longi; rhachis ramique scabri; pedicelli 0.5-2 mm. longi, scabridissimi; spiculae circa 4.5 mm. longae, valde laterale compressae; glumae viridiusculae vel purpurascentes, parum inaequales gluma inferior brevior, 1-nerves, carinatae, carinis scabridis, laterale minute scaberulae, acutissimae, anguste divergentes; lemma ambitu anguste-lanceolatum, haud glumam excedens, minutissime scaberulum, parum induratum, 5-nerve, angustissime truncatum vel obscure dentatum ad spicem, setam dorsam supra mediam circa 1 mm. ab apice ferens; seta circa 5 mm. longa, valde exserta, tenuis, reflexa; callus pilis tenuibus 0.2-1.2 mm. longis barbatus; palea quam lemmam brevior, tenuissima, membranacea, angusta, anguste truncata, obscure et minute ciliolata ad apicem, 2-carinata; rhachilla o vel vix producta; antherae 3, circa 0.8 mm. longae.

Loc.: New South Wales: George's River, Herne Bay, J. Vickery, 9.11.1930, No. 102 A (Type. K., S.).

Erect, tufted perennial, about 90 cm. high; culms about 5-noded, the internodes exceeding the sheaths, striate, scabrous in the grooves; nodes glabrous; sheaths becoming loose at the top, densely pubescent; ligule membraneous, truncate, jagged and laciniate, 1-2 mm. long, finely but rather densely pubescent; blades flat or loosely involute, 10-30 cm. x 2-4 mm., deeply grooved on both surfaces, the lower surface scabrous, the upper surface densely pubescent; panicle contracted, linear to narrow-lanceolate, 20-30 cm. long, lobed, moderately dense, the branches appressed or slightly spreading, 3-4-nate, unequal, the shorter branches divided about 8 mm. from their bases, the longest branches undivided for up to 4 cm., the lower internodes up to 6 cm. long, the rhachis and branches scabrous; branches 1-2-nately divided, the ultimate branchlets bearing spikelets racemosely; pedicels 0.5-2 mm., very scabrous; spikelets about 4.5 mm. long, rather strongly laterally compressd; glumes greenish or purplish, slightly unequal, the lower glume the shorter, 1-nerved, keeled, scabrous on the keels, minutely scaberulous on the sides, very acute, narrowly gaping; lemma narrow-lanceolate, not exceeding the glumes, very minutely scaberulous, slightly indurated, 5-nerved, very narrowly truncate or obscurely toothed at the apex, with a dorsal awn placed above the middle, about 1 mm. from the apex; awn about 5 mm. long, much exserted, fine, reflexed; callus barbed with fine hairs, 0.2-1.2 mm. long; palea shorter than the lemma, very thin, membraneous, narrow, narrowly truncate, obscurely and minutely ciliate at the apex, 2-keeled; rhachilla not or scarcely produced; anthers 3, about 0.8 mm. long.

8. *Deyeuxia imbricata* n. sp.

Gramen erectum, caespitosum, subglabrum, perenne, 80-100 cm. altum; culmi tenues vel validiusculi, 3-4-nodis; internodi vaginas excedentes, striati, in sulcis scaberuliusculi; nodi glabri; vaginae tandem laxae, striatae, scaberuliusculae et remote pubescentes; ligulae membranaceae, truncatae, laciniatae, 3-6 mm. longae, tenuiter pubescentes; laminae lineares, acuminatae, ad 30 cm. x 4.5 mm., untrinque sulcatae et scabridae; panicula densissima, linearis—angustissimo-elliptica, interdum parum lobata, 7.14 cm. x 6-15 mm.; rhachis scabrida, ramis multis, brevibus, scabridissimis, appressis, divisis tecta; rami breviori spiculas multas, dense imbricatas etiam ad bases ferentes; internodus inferior circa 1.5 cm. longus; pedicelli 0.3-1 mm. longi, scabridissimi; spiculae 2-3.5 mm. longae, valde laterale compressae; glumae viridescentes vel stramineoae, parum divergentes, scariosae ad margines, subaequales vel gluma inferior plerumque parum longior vel interdum parum brevior quam superior, 1-nerves, carinatae, carinis scabrissimis, lateribus manifeste scaberulis, acutae; lemma quater brevior glumis, ambitu lanceolatum, truncatum et minute 4-dentatum ad apicem, scaberulum, 5-nerve, nervis prominentibus supra, setam tenuem, posteriorem circa 0.6 mm.

infra apicem ferens; seta recta, haud vel vix lemma excedens; callus minute et remote barbatus pilis ad 0.3 mm. longis; palea quam lemma brevior tertiis partibus, tenuissima, membranacea, 2-carinata, obtusa et minute ciliolata ad apicem; rhachilla haud vel vix producta; antherae 3, circa 0.7 mm. longae, oblongae.

Loc.: Queensland: Stanthorpe, F. M. Bailey, Feb. 1889, and Dec. 1875.

New South Wales, Glen Innes, grassland, J. Vickery, No. K. 36, 30.12.1934. (Type. K., S.); Glen Elgin, J. White-Haney, No. 36, 29.4.1930; Burradoo, J. N. Whittet, No. 1, 1931; Walcha district, A. R. Crawford, 6.1900, No. K. 46; Jenolan Caves, W. F. Blakely, 1900, No. K. 48; Inverell, E. O. Thomas, 11.1912.

Erect, tufted, subglabrous perennial, 80-110 cm. high; culms slender to rather stout, 3-4-noded, the internodes exceeding the sheaths, striate, slightly scaberulous in the grooves; nodes glabrous; sheaths becoming loose, striate, slightly scaberulous and sparsely pubescent; ligule membraneous, truncate, jagged, laciniate, 3-6 mm. long, finely pubescent; blades linear, acuminate, up to 30 cm. x 4.5 mm., grooved and scabrous on both surfaces; panicle very dense, linear to very narrow elliptical in outline, sometimes slightly lobed, 7-14 cm. x 6-15 mm., the rhachis scabrous, concealed by the numerous, short, very scabrous, clustered, appressed, divided branches, the shorter branches bearing numerous densely imbricate spikelets right to their bases; lowest internode about 1.5 cm. long; pedicels 0.3-1 mm. long, very scabrous; spikelets 2-3.5 mm. long, strongly laterally compressed; glumes greenish or straw-coloured, narrowly gaping, scarious towards the margins, subequal or the lower glume usually slightly longer than, sometimes slightly shorter than the upper, 1-nerved, keeled, scabrous on the keels, conspicuously scaberulous on the sides, acute; lemma shorter than the glumes by about one quarter, lanceolate in outline, truncate and minutely 4-toothed at the apex, scaberulous, 5-nerved, the nerves rather conspicuous in the upper part, with a fine, dorsal awn attached about 0.6 mm. below the apex; awn straight, not or scarcely exceeding the lemma; callus minutely and sparsely barbed with hairs up to 0.3 mm. long; palea two thirds the length of the lemma, very thin, membraneous, 2-keeled, obtuse and minutely ciliolate at the apex; rhachilla not or scarcely produced; anthers 3, about 0.7 mm. long, oblong.

9. *Deyeuxia monticola* (Roem. & Schult.) n. comb.

Syn.: *Agrostis monticola* Roem. & Schult. Syst. ii. p. 359 (1817); *Agrostis montana* R.Br. Prod., p. 171, (1810), non Krock. (1787); Hook. f. Fl. Tas. ii. p 116 (1860) tab. CLX A; *Vilfa montana* (R.Br.) Beauv. Agrost. p. 16 (1812); *Deyeuxia montana* (R.Br.) Benth. Fl. Austral. vii. p. 581 (1878), non Beauv. (1812); *Deyeuxia quadriseta* var. *montana* (R.Br.) Ewart, Vict. Nat. xxiv. p. 13 (1907).

Maiden and Betche, Census of N.S.W. Pl. (1916) p. 21, incorrectly identified this species with *Calamagrostis montana* DC.

Loc: New South Wales: Barrington Tops, Woodland, 4000 feet, J. Vickery, 7.1.1934, No. K.39, and 1.1930; Mt. Victoria, J. H. Maiden 12. 1896; Canberra, A. Burges, 1.1931; Mt. Franklin, A. Melvaine, March, 1934, No. A.26; Near Mt. Franklin, S. T. Blake 19.1.1939: No. 13891 in bogs and wet rocky crests, 4800-5000 feet, and No. 13888, in *E. pauciflora* forest about 5000 feet; Mt. Kosciusko, J H. Maiden and W. Forsyth, 1.1899.

Victoria: Mt. Buffalo, on rocky granite hillsides in *Eucalyptus* forest, about 4500 feet, S. T. Blake, No 7327, 25.1.1935; Mt. Buffalo, in rock crevices, about 5000 feet, S. T. Blake, No. 7396, 26.1.1935.

Tasmania: Van Diemans Land, Table Mountain, R. Brown, No. 6215 (Type K. and B.M.); without exact locality, Oldfield; Hobart, Gunn. 14.12.1840, No. 991? in part; Mt. Wellington, Gunn, No. 1479 in part, 31.1.1840 and 1.2.1839; Mt. Wellington, 2000 feet, D. Martin, No. K. 38, 9.1934; Cambridge roadside, D. Martin, No. K. 37, 1.1934; Mt. Wellington, E. Cheel, 3.1910; Mount Field East, about 4000 feet J. H. Maiden, March, 1906; Huon Road, L. Rodway, 1891; Brown Mountain, L. Rodway, 4.1899.

Erect, rather densely tufted, subglabrous perennial, 10-70 cm. high, usually growing at high altitudes; culms 2-3 noded, the lower internodes sometimes included in the sheaths, the upper internodes exserted, the highest internode densely retrorsely scabrous under the panicle; nodes glabrous; leaves numerous from the base; sheaths appressed to the culms or at last becoming loose, scabrous; ligule membraneous, obtuse, somewhat ciliate at the apex, 1-2 mm. long, scabrous or scaberulous; blades fine, usually subulate, with a distinct callus point, strongly retrorsely scabrous, 5-20 cm. long; panicle linear to linear-lanceolate, usually much contracted, sometimes interrupted at the base, 5-15 cm. long, with 2-4-nate, unequal branches, the shorter branches divided and bearing spikelets almost from the bases, the longer ones undivided for 1-2 cm., appressed, the lowest internode 1-3 cm. long; pedicels 0.5-2 mm. long, and, together with the branches, scabrous; spikelets 4.5-6 mm. long, loosely imbricate, laterally compressed; glumes unequal, the lower glume slightly shorter than the upper, subacuminate, rather narrow, greenish or purplish, 1-nerved, strongly keeled, scabrous on the keels, very minutely scaberulous on the sides; lemma lanceolate in outline, 4-nerved above the middle, the nerves fairly conspicuous, densely scaberulous, shorter than the upper glume, very narrowly truncate and obscurely toothed at the apex, bearing a dorsal awn attached below the middle; awn exceeding the lemma, exserted, twisted in the lower part; callus barbed with hairs 0.2-0.8 mm. long; palea shorter than the lemma, narrowly truncate and 2-toothed at the apex, 2-keeled, scaberulous on the keels to below the middle, narrow, rather firm; rhachilla very variously produced to form a bristle sometimes short and glabrous, sometimes longer bearing long hairs, and occasionally bearing a second lemma (several conditions of the rhachilla may occur even on the one panicle); anthers 3, broad-linear, about 1.5 mm. long.

In the specimen Gunn. No. 991?, the plant is up to 120 cm. high, and the panicle 25 cm. long.

On account of its variability in certain features upon which undue emphasis has been placed in the past, such as the prolongation of the rhachilla, this species has given rise to much confusion in Australian literature. It is, however, a quite distinctive species.

Deyeuxia monticola var. *valida*, n. var.

Ab typo spiculis 6-7 mm. longis, glumis subaequalis valde purpurascentibus, culmis altioribus 60-90 cm. longis plus minusve laevis sub paniculis, vaginis inferioribus purpurascentibus, ligulis circa 4 mm. longis, laminis laxe convolutis vel saepe subter planis vix subulatis ad 30 cm. longis, paniculis plerumque 15 cm. x 1.5-2.5 cm. valde purpurascentibus differt.

Loc.: New South Wales: Brindabella, T. G. B. Osborn, 31.12.1933 (Type S.); near Mt. Franklin, in *Eucalyptus pauciflora* forest, about 5,000 feet, S. T. Blake, No. 13889, 19.1.1939.

Differs from the type in its larger, strongly purplish spikelets, taller and more robust habit, with leaves only loosely convolute, often flat near the base, longer ligule, purplish lower sheaths, and rather larger panicle. Although closely related to *D. monticola,* this appears to be a distinctive variety.

10. *Deyeuxia carinata* n. sp.

Gramen caespitosum, subglabrum, plus minusve decumbens, perenne, circa 20-30 cm. altum; culmi 3-nodes; internodi in vaginis inclusi; vaginae striatae, scaberulae, ad culmos appressae subter, tandem laxe supra; ligulae 5-6 mm. longae, membranaceae, truncatae, laciniatae, ad apicem ciliolatae, pubescentes; laminae planae vel laxe plicatae, firmae, lineares, 5-8 cm. longae, subobtusae, carinatae ad apicem, acumine breve calloso, utrinque scabridiusculae; panicula densa, cylindrica, circa 8 cm. longa; spiculae imbricatae, racemosae, in ramis brevibus, fasciculatis, appressis, divisis natae; pedicelli 0.5-2 mm. longi; rhachis, rami pedicellique dense scabridi; spiculae 5.5-6 mm. longae, laterale compressae; flosculi evidenter cleistogami; glumae inaequalae, gluma inferior brevior et mucronata, superior subacuminata acumine minuto, viridescentes ad medium, hyalinae ad margines, 1-nerves, carinatae, carinis tenuiter scabridis, lateribus scaberulis, parum divergentes; lemma glumis brevior truncatum et bifidum ad apicem, ambitu lanceolatum, scaberulum, obscure 4-nerve super medium, setam posteriorem parum super medium ferens; seta lemma excedens, breve exserta, circa 4 mm. longa, geniculata, subter contorta; callus circa 0.2 mm. longus pilis 0.2-1.2 mm. longis barbatus; palea quam lemma brevior, circa 3.5 mm. longa, angustissime truncata et obscure ciliolata ad apicem, tenuis, membranacea, 2-carinata, carinis scaberulis ad infra medium; rhachilla in setam tenuem, glabram circa 0.5 mm. longam producta; antherae 3, circa 0.7 mm. longae in flosculis cleistogamis; antherae normales non visae.

Loc.: New South Wales: Mt. Kosciusko, F. Mueller (Type K.); Mt. Kosciusko, Bett's Camp, J. H. Maiden, 16.2.1914; Boggy Plains, Snowy Mts., W. Bauerlen, 3.1890.

More or less decumbent, subglabrous, tufted perennial, about 20-30 cm. high; culms about 3-noded, internodes enclosed in the leaf sheaths; sheaths striate, scaberulous, appressed to the culms in the lower part, becoming loose in the upper part; ligule 5-6 mm. long, membraneous, truncate, jagged, ciliate at the apex, pubescent; blades flat or loosely folded, firm, linear, 5-8 cm. long, subobtuse, keeled at the apex, with a short callus point, slightly scabrous on both sides; panicle dense, cylindical, about 8 cm. long; the spikelets imbricate, born racemosely on short, clustered, appressed, divided branches; pedicels 0.5-2 mm. long; rhachis, branches and pedicels densely scabrous; spikelets 5.5-6 mm. long, laterally compressed; florets apparently cleistogamous; glumes unequal, the lower glume the shorter and mucronate, the upper glume subacuminate with a minute point, greenish towards the centre with hyaline margins, 1-nerved, keeled, finely scabrous on the keels, scaberulous on the sides, narrowly gaping; lemma shorter than the glumes, truncate and bifid at the apex, lanceolate in outline, scaberulous, obscurely 4-nerved above the middle, with a dorsal awn attached slightly above the middle; awn exceeding the lemma, shortly exserted, about 4 mm. long, twisted in the lower part, geniculate; callus about 0.2 mm. long, barbed with 0.2-1.2 mm. long hairs; palea shorter than the lemma, about 3.5 mm. long, very narrowly truncate and obscurely ciliolate at the apex, thin, membraneous, 2-keeled, scaberulous on the keels to below the middle; rhachilla produced into a fine, glabrous bristle about 0.5 mm. long; anthers 3, about 0.7 mm. long in cleistogamous florets; normal anthers not seen.

11. *Deyeuxia minor* Benth. Fl. Austral, vii. p. 582 (1878).

Syn.: [*Agrostis minor* F. Muell. ex Benth. l.c. in syn.]; *Agrostis minor,* J. M. Black, Trans. and Proc. Roy. Soc., South Austral. lx. (1936) p. 165; *Agrostis quadriseta* var. *minor* F. Muell. ex Benth. l. c. in syn.]; *Calamagrostis minor* (Benth.) J. M. Black, Trans. and Proc. Roy. Soc. South Austral. xliii (1919) p. 27.

Loc.: Victoria: Corner Inlet, F. Mueller, 1853.

Tasmania: Southport, C. Stuart (Type K. I have selected this specimen as the type, since it is the best developed and most abundant specimen of those cited by Bentham).

South Australia: Kangaroo Island, Rocky R., J. B. Cleland, 18.4.1924.

Small, tufted, subglabrous perennial, erect or slightly decumbent at the base, 8-45 cm. high; culms slender, usually 3-noded, the internodes exserted from the sheaths; nodes glabrous; sheaths appressed to the culms, or slightly loose at the top, slightly scabrous; ligule membraneous, broadly ovate, somewhat jagged, 1-2 mm. long; blades flat, or loosely involute when dry, fine, 2-15 cm. x 1-2 mm.; panicle oblong to narrow oblong, 1-3.5 cm. x 5-9 mm., dense, the rhachis smooth or scaberulous, the spikelets on short, clustered, appressed, scabrous branches, more or less imbricate, the lowest internode 4-8 mm. long; spikelets about 4 mm. long, slightly laterally compressed; glumes rather broad, acute, 1-nerved, keeled, very scabrous on the keel, minutely scaberulous on the sides, greenish or purplish towards the centre, purplish or whitish and scarious towards the margins, narrowly gaping; lemma shorter than the glumes, about 3 mm. long, lanceolate, minutely 4-toothed at the apex, distinctly and closely scaberulous, prominently 4-nerved above the middle, smooth and slightly furrowed between the nerves towards the apex, with a dorsal awn attached about the middle; awn twisted in the lower part, 4-5 mm. long, exserted, geniculate; palea 2-keeled, minutely scaberulous on the keels in the upper part, fairly thin, shorter than the lemma; rhachilla not produced; anthers 3, 0.5-0.8 mm. long.

12. *Deyeuxia crassiuscula* n. nom.

Syn.: *Agrostis nivalis* F. Muell., Trans. Vict. Inst. 1855, p. 43; *Deyeuxia nivalis* (F. Muell.) Benth. Fl. Austral. vii. p. 583 (1878), non Wedd. (1875); *Calamagrostis nivalis* (F. Muell.) Maiden & Betche, Census of N.S.W. Plants, 1916, p. 21. Figured in Ag. Gaz. N.S.W. 13 (1902), p. 375, sub. *Deyeuxia nivalis.*

The combination *Calamagrostis nivalis* based on *Agrostis nivalis* F. Muell. was incorrectly ascribed to Hackel by Maiden and Betche, l.c., and the error was followed in Ewart, Flora of Victoria, 1930, p. 170.

Loc.: New South Wales: Mt. Kosciusko, 5,500 feet, J. H. Maiden, 1.1898, 16 K.41; Mt. Kosciusko, Tree line to 7,000, in dry crevices of granite rocks, J. H. Maiden and W. Forsyth, January, 1899.

Victoria: Mount Hotham, J. H. Maiden, Jan. 1900; Mount Buller, F. Mueller, 1853 (Type. K.)

Erect or ascending perennial, up to 30 cm. high; culms unusually stout for such a short grass, 5-7-noded, the internodes enclosed by the overlapping leaf-sheaths; sheaths appressed to the culms, or the lower ones becoming loose, scarcely scaberulous; ligule membraneous, truncate, laciniate, minutely ciliate at the apex, 1-2 mm. long, scaberulous to pubescent; blades linear, narrowed into an acute point, 3-10 cm. x 4-6 mm., flat or very slightly inrolled, rigid, thick, smooth or minutely scaberulous on the back, deeply furrowed between the veins and scabrous to pubescent on the upper surface; panicle dense, very narrow-lanceolate to subcylindrical, slightly lobed, 6-7 cm. x 7-12 mm., the spikelets born on short, scabrous, appressed, clustered, divided branches, the lowest internode 1.5-2 cm. long; pedicels 0.8-2 mm. long, scabrous; spikelets about 4 mm. long, rather turgid; glumes not widely gaping, purplish towards the tips, rather broad, acute or minutely mucronate, subequal or the upper glume slightly longer than the lower, 1-nerved, keeled, scabrous on the keels especially in the upper part, minutely but fairly densely scaberulous on the sides, rather rigid; lemma subequal to the glumes, lanceolate in outline, finely but densely scaberulous, indurated, 5-nerved below the middle, the nerves more conspicuous towards the base, acute or narrowly truncate, with a dorsal awn attached above the middle; awn 0.5-2 mm. long, straight, shortly exceeding the lemma; callus barbed with hairs 0.5-1.4 mm. long; palea subequal to or very slightly shorter than the lemma, 2-keeled, minutely scaberulous on the keels and sides in the upper part, rather firm, rather broad, truncate or minutely 2-toothed; rhachilla produced into a more or less glabrous bristle about 0.7 mm. long; anthers 3, about 1-1.2 mm. long.

13. *Deyeuxia Rodwayi.* n. sp.

Gramen erectum vel ascendens, tenuissimum, subglabrum, perenne, 15-40 cm. altum; culmi circa 3 nodis glabris, internodis vaginas excedentibus, tenuiter scabridis; vaginae plerumque ad culmos appressae, striatae, scabridae; ligulae membranaceae, truncatae, lacinatae, 2-3 mm. longae, scabridae vel pubescentes; laminae planae, tenuiusculae, 4-10 cm. x 1-3 mm. lineares, acutae, utrinque scabridae vel pubescentes; panicula stricta vel aliquantum patens, 4-11 cm. longa, non densa; rami 2-3-nati, appressi vel parum patentes, spiculas prope ad bases ferentes, vel rami longiores 1-2 cm. subter nudi; rhachis ramique remote scabridi; internodus inferior 1-2.5 cm. longus; pedicelli graciles, 0.5-3 mm. longi, scabridi; spiculae 3.5-4.2 mm. longae, laterale compressae; glumae parum inaequales, gluma inferior brevior, angustae, acutae, 1-nerves, viridescentes vel purpurascentes, marginibus scariosis, carinis scabridis, lateribus minutissime scaberulis, late divergentes; lemma glumam subaequalans, ambitu lanceolatum, anguste truncatum et obscure dentatum ad apicem, densissime scaberulum, 4-nerve supra medium, setam posteriorem supra mediam ferens; seta circa 2 mm. longa, breve lemma excedens; callus pilis 0.2-0.8 mm. longis barbatus; palea lemma subaequalans, latiuscula, firmiuscula, 2-carinata, carinis scaberulis supra; rhachilla in setam subglabram circa 0.5 mm. longae, late oblongae, caryopsis 2 mm. longa, angusto-oblonga.

Loc.: Tasmania: Mt. Wellington, track to Organ Pipes, 3500 feet, F. A. Rodway, No. 20, 12.4.1931 (Type K.); Mt. Wellington, 1000 feet, D. Martin, No. K. 35, 4.1933; Mt. Field East, about 4000 feet, J. H. Maiden, 3.1906; Russell Falls, E. Cheel, 3.1910; without exact locality, Archer; Mt. Wellington, A. H. S. Lucas, 1.1901; Hobart, A. H. S. Lucas, 12.1923; Mt. Wellington, Gunn No. 1462, 1.3.1839 and No. 1479 in part, 29.1.1849.

Erect or ascending, very slender, subglabrous perennial, 15-40 cm. high; culms about 3-noded, the internodes exceeding the sheaths, finely scabrous; nodes glabrous; sheaths mostly appressed to the culms, striate, scabrous; ligule membraneous, truncate, laciniate, 2-3 mm. long, scabrous to pubescent; blades flat, rather thin, 4-10 cm. x 1-3 mm., linear, acute, scabrous to pubescent on both sides; panicle contracted or somewhat spreading, 4-11 cm. long, not dense, the branches 2-3-nate, appressed or slightly spreading, bearing spikelets almost to the base, or the longer branches bare for 1-2 cm.; rhachis and branches sparsely scabrous, the lowest internode 1-2.5 cm. long; pedicels slender, 0.5-3 mm. long, scabrous; spikelets 3.5-4.2 mm. long, laterally compressed; glumes slightly unequal, the lower glume the shorter, narrow acute, 1-nerved, greenish or purplish with scarious margins, keeled, scabrous on the keels and very minutely scaberulous on the sides, widely gaping at maturity; lemma subequal to the glumes, lanceolate in outline, narrowly truncate and obscurely toothed at the apex, very densely scaberulous, 4-nerved above the middle, with a dorsal awn attached about the middle; awn about 2 mm. long, shortly exceeding the lemma; callus barbed with hairs 0.2-0.8 mm. long; palea subequal to the lemma, rather broad, rather firm, 2-keeled, scaberulous on the keels in the upper part; rhachilla produced into a subglabrous bristle about 1 mm. long; anthers, 3 short, about 0.5 mm. long, broadly oblong; grain 2 mm. long, narrow oblong.

A specimen from New South Wales: Mt. Kosciusko, J. H. Maiden and W. Forsyth, 1.1900, No. K. 56, may belong to this species, but the florets are rather young for exact determination.

14. *Deyeuxia accedens* n. sp.

Gramen erectum, gracillissimum, subglabrum, perenne, 50-100 cm. altum; culmi circa 3-nodes; internodi vaginas excedentes, inter nervos scaberuli; nodi glabri; vaginae ad culmos appressae vel tandem lexae, inter nervos scaberulae; ligulae membranaceae, truncatae, laciniatae, 2-4 mm. longae, pubescentes; laminae tenues, planae, lineares, acutissimae, 4-12 cm. x 1.5-4 mm., in nervis scabridae subter, scabridae vel pubescentes supra; panicula circa 10 cm. longa, laxa, patens vel strictiuscula; rami 2-3 nati, plerumque nudi et non divisi subter ad 0.8-2 cm, tum aliquando divisi et spiculas paucas racemosas ad apices ferentes; internodus inferior 2-4 cm. longus; rhachis scaberula; rami et pedicelli scabridi; pedicelli 0.5-2 mm. longi; spiculae 4.5-5 mm. longae, laterale compressae; glumae parum inaequales, inferior brevior, plus minusve acutae, 1-nerves, carinatae, carinis scabridis, lateribus, minutissime scaberulis, viridescentes vel purpurascentes, marginibus scariosis; lemma parum brevius gluma superiore, ambitu lanceolatum, acutum vel anguste truncatum et bifidum ad apicem, fulvum, dense scaberulum, validiuscule induratum, obscure 5-nerve infra medium, setam posteriorem circa ad medium ferens; seta geniculata, parum contorta subter, 3-4 mm. longa, lemma breve excedens; callus pilis rigidiusculis 0.3-1 mm. longis barbatus; palea lemma subaequalans, latiuscula, firmissima, angustissime truncata ad apicem, 2-carinata, carinis scaberulis ad infra medium; rhachilla in setam 0.1 mm. longam pilis rigidiusculis ad 0.8 mm. longis producta; antherae ad 2 mm. longae, angustissimo-oblongae.

Loc.: Tasmania: Without exact locality, Oldfield (Type K.); towards Arthurs Lakes, 2000 feet, Gunn, No. 1462 in part, 17.1.1845.

Erect, very slender, subglabrous perennial, 50-100 cm. high; culms about 3-noded, the internodes exceeding the sheaths, scaberulous between the veins; nodes glabrous; sheaths appressed to the culms, or at length becoming loose, scaberulous between the veins; ligule membraneous, truncate, jagged or laciniate, 2-4 mm. long, pubescent; blades thin, flat, linear, very acute, 4-12 cm. x 1.5-4 mm., scabrous on the veins on the lower surface, scabrous to pubescent on the upper surface; panicle about 10 cm. long, loose, spreading or rather contracted with 2-3-nate branches, mostly bare and undivided at their bases for 0.8-2 cm., then very sparingly divided and bearing a few spikelets racemosely towards their ends; lowest internode 2-4 cm. long; rhachis scaberulous; branches and pedicels scabrous; pedicels 0.5-2 mm. long; spikelets 4.5-5 mm. long, laterally compressed; glumes slightly unequal, the lower glume the shorter, more or less acute, 1-nerved, keeled, scabrous on the keels, very minutely scaberulous on the sides, greenish or purplish, scarious towards the margins; lemma slightly shorter than the upper glume, lanceolate in outline, somewhat acute or narrowly truncate and bifid at the apex, brownish, densely scaberulous, rather strongly indurated, faintly 5-nerved below the middle, with a dorsal awn attached about the middle; awn slightly twisted in the lower part, geniculate, 3-4 mm. long, shortly exceeding the lemma; callus barbed with rather stiff hairs 0.3-1 mm. long; palea subequal to the lemma, rather broad, very firm, very narrowly truncate at the apex, 2-keeled, scaberulous on the keels to below the middle, rhachilla produced into a bristle about 1 mm. long, bearing rather stiff hairs up to 0.8 mm. long; anthers nearly 2 mm. long, very narrow oblong.

A specimen from New Norfolk, Gunn, No. 1106, November 1840, appears to belong to this species. It differs only in having the bristle more or less glabrous, and anthers under 1 mm. long. The spikelets, however, appear to have been cleistogomous, as they contain almost mature grains in addition to the anthers, which would account for the much reduced size of the latter.

15. *Deyeuxia frigida* F. Muell. ex Benth. Fl. Austral. vii. p. 583, (1878) pro parte.

Syn.: [*Agrostis frigida* F. Muell. Herb. ex Benth, 1. c. in syn.]; *Agrostis frigida* F. Muell. Syst. Census of Austral. Pl. (1882) p. 133; *Calamagrostis frigida* (F. Muell. ex Benth.) Maiden and Betche, Census of New South Wales Pl., (1916) p. 21.

The combination *Calamagrostis frigida* was incorrectly ascribed to Hackel by Maiden and Betche, 1.c., and this error was followed in Ewart, Flora of Victoria, (1930).

Loc.: New South Wales: Recorded in Moore and Betche, Handbook of the Flora of New South Wales (1896) and subsequent works, but I have seen no specimens from this State.

Victoria: Mount Buller, F. Mueller, 1853 (Type. K.); Black Spur, 1000 feet, A. Meebold, No. 2092, December. 1928.

Rather stout, erect, loosely tufted, subglabrous perennial, 90-150 cm. high; culms 5-6 noded, the internodes exserted from the sheaths, scabrous; nodes glabrous; sheaths becoming loose from the culms, striate, slightly scaberulous between the veins; ligule membraneous, obtuse, jagged, often laciniate, scaberulous, 1-3 mm. long; blades **flat, linear,** acute, up to 20 cm. x 6 mm.. shallowly furrowed on both sides, scabrous on the margins and lower surface; panicle about 25 cm. long, loose, laxly spreading, with clustered, 2-4-nate branches, the lower internodes 4-6 cm. long; branches very slender, unequal, bare and undivided at the base for 2-4 cm., then again sparsely divided, rather sparsely scabrous; pedicels 1-6 mm. long, sparsely scabrous; spikelets 4.5-5.5 mm. long, laterally compressed; glumes very unequal, the upper glume about one third longer than the lower, very acute, rather broad, greenish or purplish with a wide, scarious margin, 1-nerved, keeled, somewhat scabrous on the keel, minutely scaberulous on the sides, gaping; lemma usually slightly shorter than the upper glume, very narrowly truncate and obscurely toothed at the apex, lanceolate in outline, densely scaberulous, brownish at maturity, 4-nerved above the middle, with a dorsal awn attached about the middle; awn exserted, geniculate, twisted in the lower part, about as long as the lemma and much exceeding it, deciduous; callus sparsely barbed with short, 0.1-1.2 mm. hairs; palea subequal to the lemma, firm, 2-keeled, scaberulous on the keels in the upper part, rather narrow, and rather acute; rhachilla produced into a bristle about 0.6-1 mm. long bearing a few hairs 0.3-1 mm. long; anthers 3, about 2 mm. long, broad-linear.

Of the 3 specimens cited by Bentham under *D. frigida,* it appears necessary to select that collected by F. Mueller from Mt. Buller as the type, although as Bentham comments, the sheet at Kew has most of the florets dropped, and the dorsal awn has fallen from those remaining, leaving a small notch on the back of the lemma. The specimen from Black Spur, however, agrees closely with the type in all ascertainable characters, and some details of the description have therefore been completed from it. The two specimens from Tasmania cited by Bentham belong to a distinct species, *D. accedens,* J. Vickery, described above.

16. *Deyeuxia Benthamiana* n. sp.

Gramen validiusculum, erectum, caespitosum, perenne, circa 75 cm. altum; culmi circa 4-nodes, scabridi, striati, internodi vaginas excedentes; nodi glabri; vaginae tandem laxae, striatae, scabriusculae; ligulae membranaceae, truncatae, laciniatae, 3-4 mm. longae, tenuiter pubescentes; laminae planae, 5-20 cm. x 2-5 mm. acutae, lineares, utrinque scabridae; panicula laxa, circa 20 cm. longa, vel raro brevior; rami 3-5-nati, filiformes, nudi 2-5 cm. ad bases, tum iterum divisi; internodi circa 4-5 cm. longi; rami rhachisque scabridi; pedicelli 0.5-4 mm. longi, scabridissimi; spiculae racemosae, ad apices ramorum ultimorum natae, 3.5-4.5 mm. longae, laterale compressae; glumae inaequales, inferior brevior, acutae, viridescentes, lateribus scariosis, 1-nerves, carinatae, carinatis scabridis, lateribus minutissime scaberulis; lemma glumam inferiorem subaequalans, ambitu latiuscule lanceolatum, scaberulum, acutiusculum vel angustissime truncatum, 4-nerve supra medium, setam brevem, posteriorem, ad vel raro pallum supra medium ferens; seta vix vel breve lemma excedens; callus breve barbatus pilis 0.2-0.6 mm. longis; palea lemma subaequalans vel paullo brevior, tenuiuscula, angustissime truncata, 2-carinata, carinis minute scaberulis supra; rhachilla in setam brevem circa 0.8 mm. longam producta, pilos breves ad apicem ferens; antherae 3, angusto-oblongae, circa 1.3 mm. longae.

Loc.: Victoria: Tyer's River, F. Mueller, 1877 (Type K.); Wilson's Promontory, ex Herb. Hooker; Mt. Buffalo, on rocky, granite hillsides in *Eucalyptus* forest, about 4,500 feet, S. T. Blake, No. 7326, 25.1.1935.

Tasmania: Huon Road, L. Rodway, 27.1.1912; Mt. Wellington, A. H. S. Lucas, 1.1901.

Erect, rather robust, tufted perennial, about 75 cm. high; culms about 4-noded, the internodes exceeding the sheaths, rather stout, scabrous, striate; nodes glabrous; sheaths becoming loose, striate, somewhat scabrous; ligule membraneous, truncate, laciniate, 3-4 mm. long, finely pubescent; blades flat, 5-20 cm. x 2-5 mm., acute, linear, scabrous on both sides; panicle loose, about 20 cm. long or occasionally much shorter, with 3-5-nate, filiform branches bare at their bases for 2-5 cm., then again divided, the spikelets born racemosely towards the ends of the ultimate branchlets, the lower internodes about 4-5 cm. long, the branches and rhachis scabrous; pedicels 0.5-4 mm. long, very scabrous; spikelets 3.5-4.5 mm. long, laterally compressed; glumes unequal, the lower glume the shorter, acute, greenish with scarious sides, 1-nerved, keeled, scabrous on the keels, very minutely scaberulous on the sides; lemma subequal to the lower glume, shorter than the upper, rather broadly lanceolate in outline, coarsely scaberulous, rather acute or very narrowly truncate at the apex, 4-nerved above the middle, with a short, dorsal awn attached about or rarely just above the middle; awn scarcely or shortly exceeding the lemma; callus shortly barbed with hairs 0.2-0.6 mm. long; palea slightly shorter than or subequal to the lemma, rather thin, very narrowly truncate, 2-keeled, minutely scaberulous on the keels in the upper part; rhachilla produced into a short bristle about 0.8 mm. long, bearing a tuft of short hairs towards the apex; anthers 3, narrow oblong, about 1.3 mm. long.

Another specimen, Sealers Cove, F. Mueller, appears to belong to this species, differing only in its short, (0.5 mm. long) anthers, rather less acute glumes and slightly less spreading panicle.

This species resembles *D. frigida* from which it differs in the smaller spikelets, the lemma distinctly shorter than the upper glume, and the shorter awn. Bentham (Fl. Austral. vii., 1878, p. 583), included this species under *Deyeuxia scabra* (R. Br.) Benth. (*Agrostis scabra* R. Br.)

17. *Deyeuxia scaberula* n. sp.

Gramen erectum, graciliusculum, perenne 60-90 cm. altum; culmi 3-4 nodes; internodi vaginas excedentes, scaberulissimi inter nervos, glabri; nodi glabri; vaginae tandem laxae, superiores scaberulae, inferiorae scabro-pubescentissimae, striatae; ligulae membranaceae, truncatae, laciniatae, 2-3 mm. longae, pubescentes; laminae planae, lineares, plerumque angustae, acutissimae, 6-15 cm. x 1.5-4 mm., utrinque scabro-pubescentes; panicula 12-25 cm. longa, laxe patens vel aliquantum stricta, ramis 3-6-natis filiformibus, brevioribus nudis indivisisque ad 0.5-1 cm. longioribus ad 3 cm., tum plerumque iterum divisis; pedicelli 0.5-4 mm. longi; rhachi ramique pedicellique scabridissimi; internodus inferior circa 4 cm. longus; spiculae racemosae ad apices ramorum ultimorum natae, numerosae, circa 3.5 mm. longae, laterale compressae; glumae tandem late divergentes, mediis viridescentibus, marginibus albescentibus vel paullo purpurascentibus, scariosis, paullo inaequales, inferior brevior, acutae, 1-nerves, carinatae, carinis scabris, latis minute scaberulis; lemma paullo brevius glumis, ambitu lanceolatum, fuscescens, tenuiter sed dense scaberulum, obtusum vel minute bifidum, obscure 5-nerve, setam minutam posteriorem sub apice ferens; seta haud vel vix lemma excedens; callus barbatus pilis paucis tenuibus 0.2-0.5 mm. longis; palea lemmam subaequalans, firmiuscula, anguste truncata, angustiuscula, 2-carinata, carinis minute scaberulis supra; rhachilla in setam circa 0.8 mm. longam pilis tenuibus 0.5 mm. longis producta; antherae 3, circa 1.5 mm. longae, angustissime oblongae.

Loc.: New South Wales: Blue Mountains, Mt. Irvine Road, J. Gregson, 1.1904.

Victoria: Mt. St. Bernard, J. H. Maiden, Jan., 1900.

Tasmania: Base of Mount Wellington, Gunn, No. 1462 in part, 7.1.1841 (Type. K. Figured in Hook. f. Fl. Tas. ii, 1860, Tab. CLXb); South Huon, Hospital Bay, Oldfield, No. 119; without exact locality, Archer; Hobart, A. H. S. Lucas, 12.1923; Longley, L. Rodway, 12.1894; Huon Road, L. Rodway, 1.1895.

Erect, tufted, rather slender perennial (?), 60-90 cm. high; culms 3-4-noded, the internodes exceeding the sheaths, very scaberulous between the veins, glabrous; nodes glabrous; sheaths becoming loose from the culms, the upper sheaths scaberulous, the lower ones very scabrous-pubescent, striate; ligule membraneous, truncate, laciniate, 2-3 mm. long, pubescent; blades flat, linear, usually narrow, very acute, 6-15 cm. x 1.5-4 mm., scabrous-pubescent on both surfaces; panicle 12-25 cm. long, laxly spreading or somewhat contracted, with clustered, 3-6-nate, filiform branches, the shorter ones bare and undivided for 0.5-1 cm., the longer ones for up to 3 cm., then usually again divided, the spikelets born racemosely on the ultimate branches; pedicels 0.5-4 mm. long; rhachis, branches and pedicels very scabrous; lowest internode about 4 cm. long;

spikelets fairly numerous, about 3.5 mm. long, laterally compressed; glumes widely gaping at maturity, greenish towards the centre, with whitish or faintly purplish, scarious margins, slightly unequal, the lower glume the shorter, acute, 1-nerved, keeled, scabrous on the keels, minutely scaberulous on the sides; lemma slightly shorter than the glumes, lanceolate in outline, pale brownish, finely but densely scaberulous, obtuse or minutely bifid at the apex, obscurely 5-nerved, with a minute dorsal awn placed immediately below the apex; awn not or scarcely exceeding the lemma; callus barbed with a few fine hairs 0.2-0.5 mm. long; palea subequal to the lemma, rather firm, narrowly truncate at the apex, rather narrow, 2-keeled, minutely scaberulous on the keels in the upper part; rhachilla produced into a bristle about 0.8 mm. long, bearing fine hairs up to 0.5 mm. long; anthers 3, about 1.5 mm. long, very narrow oblong.

Hooker f. (Fl. Tas., ii, 1860, p. 116 and Tab CLXb.) and Bentham (Fl. Austral. vii, 1878, p. 583) incorrectly identified this species with *Agrostis scabra* R.Br. [*Deyeuxia scabra* (R.Br.) Benth. (1878) non Kunth (1829)].

18. *Deyeuxia contracta* (F. Muell.) n. comb.

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Syn.: *Agrostis contracta* F. Muell. ex Hook. f. Fl. Tas., ii, p. 116, t. 161. (1860.)

Loc.: New South Wales: Barber's Creek, J. H. Maiden, 1. 1898.

Victoria: South Huon River, Shipwrights Point, stony ground, Oldfield, no. 120 (Type, K.); Dandenong, F. Mueller, 1853; Buffalo Range, F. Mueller, 1853; Bairnsdale district, J. Vickery, 26.1.1935. No. K. 34; towards Mt. Feathertop, 2,600 feet, A. J. Tadgell, Jan., 1918.

[illegible] by Miss [illegible]

Erect or ascending, tufted, subglabrous perennial, 30-90 cm. high; culms 4-noded, rather slender, the internodes sometimes longer than the sheaths, smooth; nodes glabrous; sheaths loose in the upper part, somewhat rough; ligule membraneous, 2-3 mm. long, obtuse; blades scabrous, linear, 4-17 cm. x 2-3.5 mm., acuminate; panicle contracted, linear to linear-lanceolate, erect or sub-nodding, 7-20 cm. long, with short, clustered, 2-4-nate, very unequal branches, the internodes between the lower branches 2-3 cm. long, the shorter branches divided almost from the base, the longer ones undivided in the lower part for 1-2 cm.; secondary branches racemose; pedicels 1-1.5 mm. long; spikelets 2.5-3 mm. long, greenish, straw-coloured or purplish; glumes unequal, the lower glume the shorter, slightly keeled, 1-nerved, slightly scabrous on the keels, very minutely scaberulous on the sides, greenish or purplish towards the centre, scarious towards the margins, acute, rather broad, somewhat gaping at the time of fruiting; lemma lanceolate, turgid, minutely but densely scaberulous, the veins inconspicuous at maturity, minutely awned just below the apex, equalling or slightly exceeding the upper glume, acutely truncate; callus barbed with short hairs 0.2-0.7 mm. long; palea equal to the lemma, broad, rather indurated, 2-keeled, the keels conspicuous and scaberulous especially in the upper part; anthers short, about 0.3 mm. long, broadly oblong; rhachilla produced into a glabrous bristle about 0.6 mm. long; grain oblong.

A specimen from Dandenong, Dr. Mueller, ex Herb. H. F. Hance in the British Museum of Natural History probably belongs to this species, but differs from the type in having the culms, sheaths and laminae abundantly clothed with fine hairs arising from small tubercle bases, and in the rather reduced inflorescence 1.5-8 cm. long.

Bentham (Fl. Austral vii., 1878, p. 583) included this species with *Deyeuxia scabra* (R.Br.) Benth.

19. *Deyeuxia microseta* n. sp.

Gramen erectum, gracile, laxiuscule caespitosum, subglabrum, perenne, 40-60 cm. altum; culmi 3-4 nodes, scaberuli, scabridi infra nodos; internodi vaginas excedentes; nodi glabri; vaginae ad culmos appressae vel tandem laxae supra, scaberulae, inferiores aliquando purpurascentes; ligulae membranaceae, 3-4 mm. longae, obtusae, laciniatae, tenuiter pubescentes; laminae 5-20 cm. x 1.5-3 mm., lineares, acutae vel acuminatae, plerumque planae, plus minusve scabridae praesertim ad margines et apices; panicula breve et aliquantum divaricate patens vel stricta et sublinearis, haud densissima, 3-10 cm. longa; rami 2-3-nati, breves, 0.5-2 cm. longi, paullo divisi, appressi vel patentes, breviores nudi ad 3-5 mm., longiores ad 1-1. 5cm., spiculas paucas ferentes; anguli inter ramos pulli; rhachis ramique scabridissimi; internodus inferior 1-2.5 cm. longus; pedicelli 0.3-3 mm. longi, scabridi; spiculae 3.5-4 mm. longae, laterale compressae; glumae viridescentes vel purpurascentes, scariosae ad margines, acutae, inaequales, inferior brevior, aliquantum divergentes, 1-nerves, carinatae, carinis scabridis, lateribus minute scaberulis; lemma minute sed dense scaberulum, ambitu lanceolatum, acutiusculum vel angustissime truncatum, brevius gluma superiore, 3-5-nerve, setam minutam posteriorem sub apice ferens; seta haud vel brevissime lemmam excedens; callus dense barbatus pilis 0.5-1.5 mm. longis; palea lemma paullo brevior, tenuis, lanceolata, anguste truncata, 2-carinata, carinis minutissime scaberulis supra; rhachilla in setam 0.7 mm. longam producta, pilis ad 1.5 mm. longis; antherae 3, circa 1 mm. longae, oblongae; caryopsis angusto-elliptica, circa 2 mm. longa.

Loc.: New South Wales: Blue Mountains: Wentworth Falls, 3,000 ft. J. Vickery, 11.1931, No. K.33 (Type. K., S.); Katoomba, 2,000 feet, A. Meebold, No. F46F, Jan. 1930; Kings Tableland, W. Forsyth, 11.1898; Leura, W. M. Carne, 1.1912; Wentworth Falls, E. Betche, 12.1894; Katoomba, H. Deane, No. 30, 1.1886; Katoomba, in Eucalypt forest, S. T. Blake, No. 13913, 22.1.1939.

Erect, slender, rather loosely tufted, subglabrous perennial, 40-60 cm. high; culms 3-4 noded, the internodes exceeding the sheaths, scaberulous, scabrous below the nodes; nodes glabrous; sheaths appressed to the culms, or becoming loose in the upper part, scaberulous, the lower sheaths sometimes purplish; ligule membraneous, 3-4 mm. long, obtuse, laciniate, finely pubescent; blades 5-20 cm. x 1.5-3 mm., linear, acute or acuminate, mostly flat, more or less scabrous especially on the margins and towards the apex; panicle shortly and somewhat divaricately spreading or contracted and sublinear, not very dense, 3-10 cm. long, with short, 0.5-2 cm., sparsely divided, 2-3-nate, appressed or spreading branches, the shorter ones bare for 3-5 mm., the longer ones for 1-1.5 cm., each bearing few spikelets; the angles between the branches dark coloured, the rhachis and branches very scabrous; lowest internode 1-2.5 cm. long; pedicels 0.3-3 mm. long, scabrous; spikelets 3.5-4 mm. long, laterally compressed; glumes greenish or purplish, scarious towards the margins, acute, unequal, the lower glume the shorter, 1-nerved, keeled, scabrous on the keels, minutely scaberulous on the sides, somewhat gaping; lemma minutely but densely scaberulous, lanceolate in outline, rather acute or very narrowly truncate at the apex, shorter than the upper glume, 3-5-nerved, with a minute, dorsal awn just below the apex; awn not or very shortly exceeding the lemma; callus densely barbed with hairs 0.5-1.5 mm. long; palea slightly shorter than the lemma, thin, lanceolate, narrowly truncate, 2-keeled, very minutely scaberulous on the keels in the upper part; rhachilla produced into a bristle about 0.7 mm. long, bearing hairs up to 1.5 mm. long; anthers 3, about 1 mm. long, oblong; grain narrow elliptical, about 2 mm. long.

20. *Deyeuxia angustifolia* n. sp.

Gramen dense caespitosum, graciliusculum, perenne, 30-70 cm. altum; culmi erecti, circa 4-nodes; internodi vaginas excedentes, glabri; nodi glabri; foliae numerosae ex base; vaginae appressae vel tandem laxae, striatae, minute scaberulae inter nervos, inferiores aliquandum purpurascentes; ligulae membranaceae, truncatae, 1-2 mm. longae, scaberulae; laminae truncatae, plerumque convolutae, inferiores ad 30 cm. x 1-2 mm., tenuiter acuminatae, utrinque sulcatae, minute et remote scaberulae subter, scabrae—pubescentes supra; panicula linearis, 2-9 cm. x 4-7 mm., stricta sed vix densa, ramis brevibus, appressis, divisis paene ad bases, spiculas paucas ferentibus; internodus inferior 1-1.5 cm. longus; pedicelli 0.5-2 mm. longi, et rhachis ramique scabridi; spiculae 4-5 mm. longae, aliquantum laterale compressae; glumae aliquantum divergentes, subaequales vel inferior paullo brevior, 1-nerves, acutae, firmiusculae, saepe purpurascentes, carinatae, carinis scabris supra, lateribus minute scaberulis; lemma glumis subaequalans, tenuiter sed dense scaberulum, ambitu lanceolatum, anguste truncatum vel bifidum, 7-nervis subter, nervis exterioribus submarginalibus, interioribus prominentibus setam brevissimam posteriorem sub apice ferens; seta crassa, haud vel vix lemma excedens; callus glaber; palea lemma subaequalans, angustissime truncata, 2-carinata, carinis minute scaberulis, lateribus firmis; rhachilla in setam minutam glabram circa 0.2 mm. longam producta; antherae 3, circa 2 mm. longae.

Loc.: New South Wales: Blue Mountains: Wentworth Falls, on sandstone, J. Vickery, No. K.32, 11.1931 (Type. K., S.); Leura, W. M. Carne, 1.1912; Leura, A. A. Hamilton, 27.1.1912; Katoomba, J. H. Camfield, 12.1908; Katoomba, swamp places in Eucalypt forest, circa 3,000 feet, S. T. Blake, No. 13912, 22.1.1939; Blackheath, A. A. Hamilton, 1.1900; Mt. Wilson, J. Gregson, 12.1902.

Densely caespitose, rather slender perennial, 30-70 cm. high; culms erect, about 4-noded, the internodes exceeding the sheaths, glabrous; nodes glabrous; leaves numerous from the base; sheaths appressed to the culms or at length loose, striate, minutely scaberlous between the veins, the lower sheaths sometimes rather purplish; ligule membraneous, truncate, 1-2 mm. long, scaberulous; blades narrow, mostly convolute, the lower leaves up to 30 cm. x 1-2 mm., very finely acuminate, grooved on both sides, minutely and sparsely scaberulous on the lower surface, scabrous to pubescent on the upper surface; panicle linear, 2-9 cm. x 4-7 mm., compact but scarcely dense, the branches short, appressed, divided almost from the base, bearing few spikelets; rhachis and branches scabrous; lowest internode 1-1.5 cm. long; pedicels 0.5-2 mm. long, scabrous; spikelets 4-5 mm. long, somewhat laterally compressed; glumes somewhat gaping, subequal or the lower glume slightly shorter than the upper, 1-nerved, keeled, scabrous on the keels in the upper part, minutely scaberulous on the sides, acute, often purplish, rather firm; lemma subequal to the glumes, finely but densely scaberulous, lanceolate, narrowly truncate or bifid at the apex, 7-nerved in the lower part, the outer nerves sub-marginal, the inner nerves fairly conspicuous, with a very short, dorsal awn placed just below the apex; awn thick, not or scarcely exceeding the lemma; callus glabrous; palea subequal to the lemma, very narrowly truncate at the apex, 2-keeled, very minutely scaberulous on the keels, the sides firm; rhachilla produced into a minute (about 0.2 mm.), glabrous bristle; anthers 3, about 2 mm. long.

21. *Deyeuxia nudiflora* n.sp.

Gramen gracile, ascendens, subglabrum, perenne; culmi ad 70 cm. longi, circa 6-nodes, geniculati subter, scaberuli inter nervos, internodis vaginas excedentibus; nodi glabri; vaginae tandem laxae, striatae, aliquantum scaberulae inter nervos;

ligulae membranaceae, truncatae, 2-3 mm. longae, laeves; laminae foliorum culmorum planae vel laxe involutae in sicco, lineares, acuminatae, 4-10 cm. x 1-2 mm., utrinque sulcatae, nervis scabridis; panicula laxa vel paullo stricta, pauciflora, ambitu lanceolata, 5-10 cm. longa; rami pauci, 1-2-nati, nudi subter ad 1-2 cm., tum paullo divisi; rhachis ramique scaberuli vel remote scabridi; internodus inferior 1-2.5 cm. longus; pedicelli 0.2-1.5 mm. longi, remote scabridi; spiculae racemosae in ramis ultimis, 3-3.5 mm. longae, viridescentes; glumae angustiusculae, acutae vel obtusiusculae, ad margines scariosae, inaequales, inferior brevior, tandem divergentes, 1-nerves, paullo carinatae, carinis scabriusculis, lateribus minute scaberulis; lemma glumas brevissime excedens, ambitu lanceolatum, truncatum vel obscure dentatum, scaberulum, manifeste 5-nervis ad apicem, sine seta; callus glaber; palea lemma aequalans, angusta, anguste truncata, tenuiuscula, 2-carinata, carinis minute scaberulis supra; rhachilla haud vel brevissime producta; antherae 3, circa 1.5-2 mm. longae, angustissime oblongae.

Loc.: New South Wales: Nowra district, Cambewarra Range, 1,000 feet, F. A. Rodway, 2.1926 (Type. K.); Congola, W. Heron, 11.1898, No. K.50.

Slender, ascending, subglabrous perennial (?); culms up to 70 cm. long, about 6-noded, geniculate at the lower nodes, the internodes exceeding the sheaths, scaberulous between the veins; nodes glabrous; sheaths becoming loose from the culm, striate. somewhat scaberulous between the veins; lingule membraneous, truncate, 2-3 mm long, smooth; blades of the culm leaves flat, or loosely involute when dry, linear, acuminate, 4-10 cm. x 1-2 mm., grooved on both sides and scabrous on the nerves; panicle loose or slightly contracted, few-flowered, lanceolate in outline, 5-10 cm. long, with few, 1-2-nate branches bare in the lower part for 1-2 cm., then sparsely divided, with a few spikelets arranged racemosely on the ultimate branches; lowest internode 1-2.5 cm. long; rhachis and branches scaberulous to sparsely scabrous; pedicels 0.2-1.5 mm. long, sparsely scabrous; spikelets 3-3.5 mm. long, greenish; glumes rather narrow, acute or rather obtuse, scarious towards the margins, unequal, the lower glume the shorter, 1-nerved, slightly keeled, slightly scabrous on the keels, minutely scaberulous on the sides, gaping at maturity; lemma very slightly exceeding the glumes, lanceolate in outline, truncate or obscurely toothed, scaberulous, distinctly 5-nerved to the apex, awnless; callus glabrous; palea equalling the lemma, 2-keeled, very minutely scaberulous on the keels in the upper part, narrow, narrowly truncate at the apex, rather thin; rhachilla not or very shortly produced; anthers 3, about 1.5-2 mm. long, very narrow oblong.

This somewhat aberrant species differs from most *Deyeuxia* spp. both in the glabrous callus and in the absence of the awn. In other characters however, it appears closely allied to this genus. In several species the callus is only sparsely provided with hairs, which are entirely absent in *D. angustifolia.* In several other species, such as *D. McKiei*, *D. parviseta* and *D. imbricata*, the dorsal awn (*i.e.*, the continuation of the central nerve) is very short and fine, sometimes almost failing to separate from the lemma.

22. *Deyeuxia brachyathera* (Stapf) n. comb.

Syn: *Dichelachne brachyathera* Stapf, Kew Bull. 1906, p. 203. (Figured in Agr. Gaz. New South Wales, xxii, 1911, p. 816.)

Los.: New South Wales: Blue Mountains, Mt. Wilson, swamp at the head of Waterfall Gully, J. Gregson, 26.3.1906 (Type, K) (Cited in error as J. Gryson in Kew Bull. 1.c.); Mt. Wilson, J. Gregson, 4.1901; Blackheath, J. H. Maiden, 1.1905, No. 45; Katoomba, 3,000 feet, in wet, open places near small stream, S. T. Blake, No. 13929, 23.1.1939; Brindabella Range, L. Pryor, 4.1937; Mt. Franklin district, A. Melvaine, No. A.22, 3.1939; Mt. Kosciusko, 6000 feet, R. Helms, 2.1893 (see Proc. Linn. Soc. N.S.W., xxiv, 1899, p. 152, sub *Agrostis densa*).

Victoria: Grampians, C.W., 1887, No. 325 (ex Herb. Waite Institute); Mt. Buffalo, in morasses, about 4500 feet, S. T. Blake, No. 7361, 25.1.1935.

Tasmania: Thomas Plains, L. Rodway, 2.1877.

Erect, tufted, subglabrous perennial, 60-120 cm. high; culms 4-noded, the internodes exserted from the sheaths; sheaths appressed to the culms, or dilated towards the top, more or less rough; ligule membraneous, broadly ovate, 3 mm. long, minutely scaberulous; blades linear, narrowed into a long, acute apex, the lower up to 35 cm. x 7 mm., flat, scabrous; panicle contracted, linear to linear-lanceolate, 8-17 cm. x 0.8-2 cm., the lower internodes 2-3 cm. distant; branches scabrous, clustered 3-5-nate, very unequal, the longer ones undivided in the lower part, the shorter ones divided from the base; secondary branches clustered, up to 1.5 cm. long, racemose; pedicels 0.5-1.5 mm. long, scabrous; spikelets 4-6 mm. long, laterally compressed, greenish or sometimes purplish; glumes narrow lanceolate, acutely and finely acuminate, scarious towards the margins, greenish or purplish towards the centre, strongly keeled, scabrous on the keels, very minutely and sparsely scaberulous on the sides, unequal, the lower one slightly shorter and 1-nerved, the upper one sometimes 3-nerved in the lower half, the lateral nerves faint; lemma 4.5-6 mm. long, lanceolate in outline, acute, entire or minutely bifid at the apex, subequalling or slightly longer than or slightly shorter than the upper glume, greenish or straw-coloured, with a dorsal awn attached about 1 mm. below the apex, minutely and rather distantly scaberulous, 5-nerved, the nerves all fairly conspicuous, the outer nerves sub-marginal; callus shortly barbed with hairs about 0.3-0.8 mm. long; awn 4-5 mm. long, more or less recurved; palea thin, 2.5-4 mm. long, minutely scaberulous on the keels in the upper part; anthers broadly oblong, 0.4-0.7 mm. long, stigma delicately plumose, 1-1.5 mm. long; rhachilla sometimes produced into a minute, glabrous bristle.

23. *Deyeuxia reflexa* n. sp.

Gramen erectum, laxe caespitosum, perenne, circa 120 cm. altum; culmi rigidiusculi, circa 6-nodes, scaberuli inter nervos, pubescentes sub nodis, internodis vaginas excedentibus; nodi subglabri; folia plerumque in culmis; vaginae tandem laxae, dense scabridae vel pubescentes, striatae; ligulae membranaceae, late ovatae, obtusae, 2-3 mm. longae, aliquantum laciniatae, tenuiter pubescentes; laminae lineares, acuminatae, planae vel laxe involutae in sicco, ad 30 cm. x 5 mm., utrinque sulcatae et retrorse scabridae; panicula magna, effusa, laxe patens et subnutans, plus minusve ambitu lanceolata, circa 20 cm. longa; rami 4-7-nati, filiformes, scabridi, nudi et indivisi ad 1-3 cm. tum divisi in ramulis brevioribus filiformibus cum spiculis paucis ad apices; internodus inferior circa 3 cm. longus; rhachis scaberula vel scabrida; pedicelli gracillissimi, subclavati, 0.5-3 mm. longi, scabridi; spiculae circa 3 mm. longae, laterale compressae; glumae tandem divergentes, angustiusculae, acutae, scariosae praesertim ad margines, viridescentes vel purpurascentes, inaequales, inferior brevior, 1-nerves, carinatae, carinis scabridis; lemma manifeste glumas excedens, ambitu lanceolatum, acutum vel minute 2-dentatum, tenuiter sed dense scaberulum, obscure 5-nerves, setam posteriorem sub apice ferens; seta circa 2-2.5 mm. longa, lemma excedens, exserta, valde reflexa, manifeste scaberula; callus barbatus pilis brevibus 0.2-0.8 mm. longis; palea quam lemmo paullo brevior, angusta, anguste truncata et aliquandum obscure et minute ciliolata ad apicem, 2-carinata, carinis lateribusque scaberulis supra; rhachilla manifeste in setam pilosam circa 1.5 mm. longam produca, pilis tenuibus ad 1.2 mm. longis; antherae 3, angustissime oblongae, 1.4-1.8 mm. longae.

Loc.: New South Wales: Dorrigo Mountain, roadside near forest, J. Vickery, No. K.31, 23.1.1934 (Type K., S.).

Erect, loosely tufted perennial, about 120 cm. high; culms rather rigid, about 6-noded, the internodes exceeding the sheaths, scaberulous between the veins, pubescent just below the nodes; nodes subglabrous; leaves mostly on the culms; sheaths becoming loose, densely scabrous to pubescent, striate; ligule membraneous, broadly ovate, obtuse, 2-3 mm. long, somewhat laciniate, finely pubescent; blades linear, acuminate, flat or loosely involute when dry, up to 30 cm. x 5 mm. when flattened, grooved and densely retrorsely scabrous on both sides; panicle large, effuse, laxly spreading and sub-nodding, more or less lanceolate in outline, about 20 cm. long; rhachis scaberulous to scabrous; lowest internode about 3 cm. long; branches clustered, 4-7-nate, filiform, scabrous, bare at the base and undivided for 1-3 cm., then further divided into shorter, filiform branchlets, bearing few spikelets towards their ends; pedicels very slender, subclavate, 0.5-3 mm. long, scabrous; spikelets about 3 mm. long, laterally compressed; glumes gaping at maturity, rather narrow, acute, scarious especially towards the margins, greenish or purplish, 1-nerved, keeled, scabrous on the keels, unequal, the lower glume nearly one-third shorter than the upper; lemma distinctly exceeding the glumes, lanceolate in outline, acute or minutely 2-toothed at the apex, very finely but densely scaberulous, obscurely 5-nerved, with a dorsal awn placed a little below the apex; awn about 2-2.5 mm. long, exceeding the lemma, exserted, strongly reflexed, distinctly scaberulous; callus barbed with short hairs 0.2-0.8 mm. long; palea very slightly shorter than the lemma, narrow, narrowly truncate and sometimes obscurely and minutely ciliolate at the tip, 2-keeled, scaberulous on the keels and sides in the upper part; rhachilla conspicuously produced into a hairy bristle about 1.5 cm. long, bearing fairly fine hairs up to 1.2 mm. long; anthers 3, very narrow oblong, 1.4-1.8 mm. long.

24. *Deyeuxia decipiens* (R. Br.) n. comb.

Syn.: *Agrostis decipiens* R. Br. Prod. p. 172 (1810); *Vilfa decipiens* (R. Br.) Beauv. Agrost. p. 16 (1812); *Cinna decipiens* (R. Br.) Kunth Rev. Gram, i. p. 67 (1829).

Loc.: Queensland: Wyerba, near Bald Rock Creek, 2,500-3,000 feet, S. T. Blake, No. 4613, 21.1.1933.

New South Wales: Port Jackson, R. Brown, No. 6221 (Type. K. and B.M.); Castle Crag, on sandstone, J. Vickery, No. 72, 4.10.1930; Hornsby, W. F. Blakely, 11.1914, No. 49; Rose Bay, W. F. Blakely; Centennial Park, Sydney, E. Cheel, 12.1900; Ryde, W. F. Blakely, 11.1912; Randwick, E. Betche, 5.1885; Lawson, W. M. Carne, 3.1912; Katoomba, J. H. Camfield, 12.1908; Katoomba, stony hillside in Eucalypt forest; S. T. Blake, No. 13902, 21.1.1939; Mt. Victoria, E. Cheel, 12.1900; Oberon, Ralph, 1.1918; Hill Top, J. Shirley; Hill Top, E. Cheel, 17.12.1911; Mount Keira, E. Cheel, 3.1912; Bodalla, E. Breakwell.

Erect, tufted, glabrous perennial, 45-100 cm. high; culms slender to rather stout, 3-4-noded, the internodes exceeding the sheaths; sheaths becoming loose towards the top, slightly scabrous; ligule membraneous, minutely scaberulous, 2-4 mm. long, broadly ovate, obtuse or truncate, laciniate; blades usually convolute when dry, linear to subsetaceous, very finely acuminate with a subulate tip, only very slightly scabrous; lower leaves 10-30 cm. x 3-4 mm. broad when flattened; panicle loose, somewhat spreading and nodding, 12-30 cm. long, the branches filiform, scabrous, 2-8-nate, bare for some distance at their bases, the longer ones nodding and bare for 3-5 cm., the spikelets racemosely arranged on short branches towards the ends; lower internode 5-6 cm. long; rhachis and primary branches scaberulous, secondary branches scabrous; pedicels 0.5-2 mm. long, scabrous; spikelets lanceolate, 2-3 mm. long, greenish or slightly purplish, somewhat laterally compressed; glumes acute, 1-nerved, keeled, scabrous on the keels and scaberulous on the sides, greenish or purplish, scarious towards the margins, the lower glume slightly shorter than or sometimes subequal to the upper glume; lemma lanceolate, equalling or slightly exceeding the upper glume, rather thin, extremely minutely and inconspicuously scaberulous, 5-nerved, the nerves fairly conspicuous, narrowly truncate, with a minute dorsal awn just below the apex; awn not or scarcely exceeding the lemma, straight; callus very short, bearing very fine hairs 0.4-1 mm. long; palea slightly shorter than the lemma, 2-keeled, very thin, membraneous, very narrowly truncate or minutely ciliate at the apex; rhachilla not or scarcely produced; anthers 3, about 0.7 mm. long, oblong; grain rather narrow oblong or lanceolate.

Bentham (Fl. Austral. vii, 1878, p. 583) incorrectly identified this plant with *Deyeuxia scabra* (R. Br.) Benth.

25. *Deyeuxia parviseta* n. sp.

Gramen erectum vel ascendens, laxe caespitosum, subglabrum, perenne, 60-120 cm. altum; culmi leviter striati, scaberuli in sulcis, circa 4-nodes, internodis vaginas excedentibus; nodi glabri; vaginae striatae, tandem laxae supra; ligulae membranaceae, truncatae, laciniatae, 1-4 mm. longae, scaberulae; laminae lineares, acuminatae, planae, 10-25 cm. x 2-4 mm., utrinque sulcatae et scabridae; panicula laxa, 12-20 cm. longa, laxe patens vel aliquando subnutans; rami 2-6-nati, filiformes, nudi et indivisi ad bases 1-3 cm., tum iterum 1-3-nate divisi; internodus inferior 2.5-3.5 cm. longus; rhachis remote scaberula; pedicelli 0.5-3 mm. longi, subclavati, scabridi; spiculae paucae ad apices ramorum ultimorum, circa 2.5 mm. longae, primo haud prominente laterale compressae; glumae inaequales, inferior brevior, obtusae, tandem divergentes, viridescentes vel purpurascentes, scariosae praesertim ad margines, 1-nerves, aliquantum carinatae, carinis obscure scabridae; lemma glumas excedens, ambitu lanceolatum, truncatum, tenuiter et dense scaberulum, 5-nervis, setam minutam posteriorem sub apicem ferens vel aliquando seta haud disiuncta; seta haud vel vix lemma excedens; callus brevis, barbatus pilis rigidiusculis 0.3-1.2 mm. longis; palea angusta, tenuis, lemma subaequalans, angustissime truncata, 2-carinata; rhachilla in setam 0.7 mm. longam producta, pilis rigidiusculis ad 1.4 mm. longis; antherae 3, circa 0.8 mm. longae.

Loc.: New South Wales: Mount Warning, in rain forest, J. Vickery, No. K. 30, 15.1.1936; Pheasant Mountain, Backwater, in the shady side of large granite rocks, T. Youman and E. N. McKie, 28.12.1936; Blue Mountains: Blackheath, 3,000 feet, J. Vickery, 17.3.1935, No. K.29 (Type K., S.); Blackheath, in steep, narrow gorges, S. T. Blake, No. 13942, 24.1.1939; Mt. Wilson, J. Gregson, 12.1903; near Mt. Tomah, J. Vickery, 29.1.1939.

Loosely tufted, erect or ascending, subglabrous perennial, 60-120 cm. high; culms lightly striate, scaberulous between the ridges and smooth to the touch, about 4-noded, the internodes exceeding the sheaths; nodes glabrous; sheaths striate, becoming loose in the upper part; ligule membraneous, truncate, jagged, 1-4 mm. long, scaberulous; blades linear, acuminate, flat, 10-25 cm. x 2-4 mm., grooved and scabrous on both sides; panicle loose, 12-20 cm. long, laxly spreading, the branches sometimes subnodding; rhachis sparsely scaberulous; lowest internode about 2.5-3.5 cm. long; branches filiform, sparsely scabrous, 2-6-nate, bare and undivided at the base for 1-3 cm., then again 1-3-nately divided; the spikelets few, arranged racemosely towards the ends of the ultimate branches; pedicels 0.5-3 mm. long, subclavate, scabrous; spikelets about 2.5 mm. long, not conspicuously laterally compressed when young; glumes unequal, the lower glume the shorter, obtuse, 1-nerved, somewhat keeled, obscurely scabrous on the keels, greenish or purplish, scarious especially towards the margins, ultimately gaping; lemma exceeding the glumes, lanceolate in outline, truncate, finely and densely scaberulous, 5-nerved with a minute, dorsal awn attached immediately below the apex, sometimes scarcely separated from the lemma and not or scarcely exceeding it; callus short, barbed with rather stiff hairs 0.3-1.2 mm. long; palea narrow, thin, 2-keeled, subequal to the lemma, very narrowly truncate; rhachilla produced into a bristle about 0.7 mm. long, bearing rather stiff hairs up to 1.4 mm. long; anthers 3, about 0.8 mm. long.

25a. *Deyeuxia parviseta* var. *Boormani* n. var.

Ab typo glumis subaequalibus, lemma glumas aequalante sed vix excedente sensim scaberulo vel prope laeve nervis manifestis, callo pilis densis, laminis subter scabridis supra dense scabro-pubescentibus.

Loc.: New South Wales: Buddawang or Baldy Mt., near Braidwood, J. L. Boorman,
2.1909, No. K. 55 (Type. K., S.).

Differs from the type in the subequal glumes, lemma equalling but scarcely exceeding the glumes, very inconspicuously scaberulous to almost smooth with conspicuous nerves, callus very densely clothed with hairs, leaves scabrous on the lower surface, densely scabrous-pubescent on the upper surface.

26. *Deyeuxia McKiei* n. sp.

Gramen erectum, laxe caespitosum, robustiusculum, subglabrum, perenne, ad 120 cm. altum; culmi rigidi, crassiusculi ad medium, 3-5-nodi, tenuiter sulcati, scaberuli in sulcis, internodis vaginas excedentibus; nodi glabri; folia plerumque ex culmis; vaginae laxiusculae praesertim supra, manifeste striatae, scaberulae praesertim in sulcis; ligulae membranaceae, 2-4 mm. longae, obtusae vel truncatae, scaberulae; laminae lineares, acuminatae, 5-30 cm. x 2-6 mm., planae vel laxae involutae, manifeste striatae, utrinque profunde sulcatae et scaberulae; panicula magna, plus minusve ambitu lanceolata, 20-40 cm. longa, laxe patens et nutans; rhachis dense scaberula; rami 2-8-nati, longi, filiformes, scabridi, nudi et indivisi ad bases 4-8 cm., tum iterum 1-3-nate divisi; internodus inferior 5-8 cm. longus; pedicelli graciles, scabridi, subclavati, 0.8-2 mm. longi; spiculae paucae ad apices remorum ultimorum, circa 3.5 mm. longae, haud prominente laterale compressae; glumae haud late divergentes, obtusae, saepe purpurascentes, inaequales, inferior brevior, scariosae ad margines, 1-nerves, paullo carinatae, carinis scabridis, lateribus minute et remote scaberulis; lemma manifeste glumas excedens, ambitu lanceolatum, anguste truncatum, dense scaberulum, 5-nervis, setam minutam posteriorem sub apice ferens vel raro seta non disiuncta; seta haud vel vix lemma excedens; callus brevis, barbatus pilis rigidiusculis 0.2-1.4 mm. longis; palea paullo brevior quam lemma, tenuis, anguistiuscula, anguste truncata vel minutissime bifida, 2-carinata, carinis minute scaberulis supra; rhachilla in setam circa 1.3 mm. longam producta, pilis rigidiusculis ad 1 mm. longis; antherae 3, circa 1-1.4 mm. longae.

Loc.: New South Wales: Black Gully, 7 miles north-west of Guyra, white soil, E. N. McKie, No. 657, 28.12.1930 (Type K.); near Elderbury Creek, 7 miles south-west of Guyra, E. N. McKie, No. 307, 22.1.1930; Cangai, Upper Clarence River, J. L. Boorman, 6.1916; ascent from the Macleay River on Bellbrook-Jeogla road, J. Vickery, No. K.28, 24.1.1934; New England, C. Stuart; Boonoo Boonoo, J. L. Boorman, 11.1904; Walcha district, A. R. Crawford, 6.1900; Barrington Tops, J. Vickery, 7.1.1934; Mt. Wilson, J. H. Maiden, 4.1896; Mt. Wilson, J. Gregson, 1.1903.

Erect, loosely tufted, robust, subglabrous perennial, up to 120 cm. high; culms rigid, rather thickened in the middle of the plant, 3-5-noded, the internodes much exceeding the sheaths, shallowly grooved and scaberulous between the ridges, hence smooth to the touch; nodes glabrous; leaves mostly on the culms; sheaths rather loose especially above, conspicuously striate, scaberulous chiefly in the grooves; ligule membraneous, 2-4 mm. long, obtuse or truncate, scaberulous; blades linear, acuminate, 5-30 cm. x 2-6 mm., flat or loosely involute, conspicuously striate, deeply grooved, and scaberulous on both sides; panicle large, more or less lancolate in outline, 20-40 cm. long, the rhachis densely scaberulous, laxly spreading and nodding, with long, filiform, 2-8-nate, scabrous branches, the branches again 1-3-nately divided; lowest internode 5-8 cm. long; branches bare at the base and undivided for 4-8 cm., then sparsely branched, the spikelets few, born racemosely towards the ends of the ultimate branches; pedicels slender, scabrous, subclavate, 0.8-3 mm. long; spikelets about 3.5 mm. long, not very prominently laterally compressed; glumes not widely gaping, obtuse, often purplish, 1-nerved, slightly keeled, scabrous on the keels, very sparsely and minutely scaberulous on the sides, scarious towards the margins, unequal, the lower glume the shorter; lemma conspicuously exceeding the glumes, lanceolate in outline, narrowly truncate, densely scaberulous, 5-nerved, with a minute dorsal awn attached just below the apex not or scarcely exceeding the lemma; callus short, barbed with rather stiff hairs, 0.2-1.4 mm. long; palea slightly shorter than the lemma, thin, rather narrow, narrowly truncate or very minutely bifid, 2-keeled, minutely scaberulous on the keels in the upper part; rhachilla produced into a bristle about 1.3 mm. long bearing rather stiff hairs up to 1 mm. long; anthers 3, about 1-1.4 mm. long.

Figured in Ag. Gaz. New South Wales, XII (1901) p. 1082 sub *D. scabra*. Close to the preceding species, from which it can be recognised by its more robust habit and larger spikelets.

27. *Deyeuxia acuminata* n. sp.

Gramen erectum, laxe caespitosum, robustiusculum, perenne, circa 100 cm. altum; culmi rigidi, glabri, scaberuli inter nervos, circa 5-nodes, internodis vaginas excedentibus; nodi glabri; folia plerumque ex culmis; vaginae laxiusculae, striatate, lateribus nervorum scaberuliusculae, glabrae; ligulae membranaceae, 4-8 mm. longae, plerumque truncatae, laciniatae, tenuniter pubescentes; laminae lineares, acuminatae, ad 30 cm. x. 5 mm., utrinque profunde sulcatae, subter scaberulae, supra dense pubescentes; panicula magna, plus minusve ambitu lanceolata, 20-40 cm. longa, laxe patens, subnutans; rhachis scaberula; rami 3-6-nati, filiformes, scabridi, nudi subter ad 2-6 cm., tum iterum divisi; internodus inferior 6-10 cm. longus; pedicelli graciles, subclavati, 1-4 mm. longi, scabridi; spiculae paucae ad apices ramorum ultimorum, 5-5.5 mm. longae, haud prominente laterale compressae, ambitu sublineares; glumae haud late divergentes, subacutae, inaequales, inferior brevior, viridescentes vel aliquantum purpurascentes, scariosae ad margines, 1-nerves, parum carinatae, carinis scabridis, lateribus minute et remote scaberulis; lemma glumas excedens, ambitu angusto-lanceolatum, anguste truncatum, dense et tenuiter scaberulum, obscure 5-nervis, setam brevissimam, rectam, posteriorem sub apice ferens; seta 1-1.5 mm. longa, breve lemma excedens; callus barbatus pilis tenuiusculis 0.2-2 mm. longis; palea lemma subaequalans, angusta, 2-carinata, latis tenuiter induratis et scaberulis, membranacea inter carinas; rhachilla in setam brevem 0.5-1 mm. longam producta, pilis tenuibus ad 1.5 mm. longis; antherae 3, lineares, 2-2.3 mm. longae.

Loc.: New South Wales: 17 miles north-east of Guyra, granite hills near Oban, 4,000 feet, E. N. McKie, No. 658, 18.12.1930 (Type K.).

Erect, loosely tufted, rather robust perennial, about 100 cm. high; culms rigid, about 5-noded, the internodes exceeding the sheaths, scaberulous between the veins, smooth to the touch, glabrous; nodes glabrous; leaves mostly on the culms; sheaths rather loose, striate, slightly scaberulous on the sides of the veins, smooth to the touch, glabrous; ligule membraneous, 4-8 mm. long, usually truncate and laciniate, finely pubescent; blades linear, acuminate, up to 30 cm. x 5 mm., deeply grooved on both sides, scaberulous on the lower surface, closely pubescent on the upper surface; panicle large, more or less lanceolate in outline, 20-40 cm. long, laxly spreading, sub-nodding, the rhachis scaberulous with filiform, 3-6-nate, scabrous branches bare at their bases for 2-6 cm., then again divided, the spikelets few, born racemosely towards the ends of the ultimate branches; lowest internode 6-10 cm. long; pedicels slender, subclavate, 1-4 mm. long, scabrous; spikelets 5-5.5 mm. long, not strongly laterally compressed, sublinear in outline; glumes not widely gaping, subacute, 1-nerved, slightly keeled, scabrous on the keels, very minutely and sparsely scaberulous on the sides, greenish or somewhat purplish, scarious towards the margins, unequal, the lower glume the shorter; lemma exceeding the glumes by more than 1 mm., narrow lanceolate in outline, narrowly truncate, closely and finely scaberulous, obscurely 5-nerved with a very short, straight dorsal awn attached just below the apex; awn 1-1.5 mm. long, shortly exceeding the lemma; callus bearded with rather fine hairs 0.2-2 mm. long; palea subequal to the lemma, narrow, 2-keeled, thinly indurated and scaberulous on the sides, membraneous between the keels; rhachilla produced into a short bristle 0.5-1 mm. long, clothed with fine hairs up to 1.5 mm. long; anthers 3, linear, 2-2.3 mm. long.

28. *Deyeuxia Gunniana* (Nees) Benth. Fl. Austral. vii. (1878) p. 584.

Syn.: *Echinopogon Gunnianus* Nees in Hook. Lond. Journ. Bot. 2, (1843) p. 413; *Agrostis Gunniana* (Nees) F. Muell., Syst. Census Austral. Pl. (1882) p. 133; ~~l.c.~~; *Deyeuxia breviglumis* Benth. Fl. Austral. vii. (1878) p. 584; ~~*Calamagrostis*~~ *Agrostis breviglumis* (Benth.) F. Muell., l.c.; ~~*Deyeuxia breviglumis* Benth. Fl. Austral. vii. (1878) p. 584~~; *Calamagrostis breviglumis* (Benth.), Maiden & Betche, Census of N.S.W. Pl. (1916) p. 21. (Figured in the Ag. Gaz., N.S.W., 13 (1902) p. 593, sub *Deyeuxia breviglumis* Benth.)

The combination *Calamagrostis breviglumis* was incorrectly ascribed to Hackel by Maiden & Betche, l.c.

Loc.: Queensland: Bank of Bald Rock Creek, Wyerba, near water, 2,500-3,000 feet, S. T. Blake, No. 4616, 21.1.1933.

New South Wales: New England, C. Stuart (Type of *Deyeuxia breviglumis* Benth. K.); Tenterfield to Sandy Flat, J. H. Maiden, 12.1898; Glen Elgin, J. White-Haney, 20.2.1930; Ebor, 3,000 feet, J. Vickery, 3.1.1934; Beilsdown Creek, Dorrigo Forest Reserve, J. H. Maiden, 12.1893; Dorrigo, J. L. Boorman, No. K.44, 3,1912; Walcha District, A. R. Crawford, No. K.43, 6.1900; Comboyne, 2-3,000 feet, J. Vickery, 21.1.1934; Barrington Tops, in swamp,

J. Vickery, 7.1.1934; Braidwood, Bauerlen; Clyde Mountain, 2,000 feet, J. Vickery, No. K.42, 3.1.1937; Jindabyne, J. H. Maiden and W. Forsyth, 1.1899.

Tasmania: Without exact locality, Gunn (Type C.); Zeehan, L. Rodway, 1.1894.

Very slender, tufted, glabrous, erect or ascending perennial (?), 7-35 cm. high; culms culms scaberulous, 2-3-noded, the internodes exceeding the sheaths, often geniculate at the base; sheaths usually thin, finely scaberulous; ligule up to 1 mm. long, obtuse or truncate; blades very fine, sometimes almost filiform or subsetaceous, 2-15 cm. x 0.5-0.8 mm., sometimes with a small callus point, smooth or finely scaberulous; panicle oblong or lanceolate to pyramidal, erect, 2-9 cm. long, with short, rather rigid, spreading, 2-5-nate branches, the branches once or twice trichotomously divided, scarcely scaberulous, the spikelets born singly at the ends of the ultimate branches; spikelets 1.7-2 mm. long, slightly laterally compressed; glumes ovate, subequal or the lower glume shorter than the upper, 1-nerved (described by Nees as 3-nerved), often rather acute when young but wearing to an obtuse apex when old, somewhat keeled, minutely scabrous on the keels in the upper part, greenish towards the centre, hyaline towards the margins, rather widely gaping, about 0.8-1.2 mm. long; lemma nearly twice as long as the glumes, lanceolate in outline, truncate, smooth and only thinly indurated but not hyaline, 3-5-nerved, with a short dorsal awn placed immediately below the apex; awn very short, about 0.5 mm., exceeding the lemma, rigid; callus shortly barbed; palea equalling the lemma, rather broad, 2-keeled, more or less truncate at the apex; rhachilla produced into a slender, glabrous or slightly hairy bristle; stamens 3; stigma subsessile.

Key to the Australian Species of *Deyeuxia*.

1. Lemma shorter than or subequal to the upper glume, rarely very slightly exceeding it.
    2. Lower glume usually longer than the upper, or the glumes subequal. Panicle mostly contracted, often dense and spike-like, or, if the branches are somewhat spreading, then the shorter branches of each cluster are densely clothed with spikelets almost to their bases.
        3. Awn attached near the base of, or at least in the lower third of the lemma, exserted.
            4. Lower lemma less than half, or scarcely more than half the length of the lower glume. Rhachilla not or scarcely produced.
                5. Panicle not very dense, 2-4 cm. long. Spikelets about 7 mm. long. Lemma 3-5 mm. long, scaberulous. Plant slender, small, 10-25 cm. high, annual. Leaves flat, thin, 3-7 cm. x 1-1.5 mm. West Australian species.
                    2. *D. Drummondii* (Steud.) J. Vickery.

                5*. Panicle dense. Mostly perennial species.
                    6. Spikelets about 8 mm. long. Panicle about 9 cm. long, cylindrical. Lemma 4-5 mm. long, densely scaberulous. Plant rather robust, 50 cm. high, the culm rather thick under the panicle. Leaves flat or somewhat inrolled, firm, 5-12 cm. x 1-5 mm. Tasmanian species.
                        1. *D. Lawrencei* J. Vickery.

                    6*. Spikelets about 6 mm. long, sometimes less. Panicle 1-7 cm. long, narrow-oblong to cylindrical. Lemma 2-2.2 mm. long, with prominent nerves, distantly but coarsely scaberulous especially on the nerves. Plant erect, rather slender, 30-50 cm. high, the culm very slender under the panicle. Leaves flat, 6-15 cm. x 2-3 mm. West Australian species.
                        3. *D. inaequalis* J .Vickery.

4*. Lemma not less than two thirds the length of the glumes, slightly to distinctly indurated, almost smooth to strongly scaberulous. Rhachilla usually not produced. Anthers 0.5-2 mm. long. Spikelets 3-6 mm. long. Panicle dense, usually over 8 cm. long and cylindrical, sometimes lobed or more or less spreading. Leaves flat or slightly inrolled.

4. *D. quadriseta* (Labill.) Benth.

3*. Awn attached above the lower third of the lemma.

7. Awn attached towards the middle of the lemma.

8. Spikelets about 3 mm. long. Awn only shortly exceeding the lemma. Prolongation of the rhachilla very short, glabrous. Glumes rather broad. Lemma very finely scaberulous. Panicle dense, 15-25 cm. x 1-2 cm., the branches slightly spreading. Plants rather robust, over 70 cm. high.

5. *D. mesathera* Stapf ex J. Vickery.

8*. Spikelets 5-5.5 mm. long. Awn exceeding the lemma by the length of the lemma, exserted. Rhachilla produced into a rather long bristle bearing fine hairs about 1 mm. long. Lemma rather coarsely scaberulous. Panicle 5-15 cm. long. Glumes narrow, greenish or straw-coloured, the lower glume either longer or shorter than the upper.

6. *D. densa* Benth.

7*. Awn attached just below the apex, not or scarcely exceeding the lemma. Lower glume either shorter or longer than the upper. Panicle 8-16 cm. x 0.8-1.5 cm. very dense, cylindrical. Spikelets about 3.5 mm. long, greenish or straw-coloured. Rhachilla not or scarcely produced. Callus shortly bearded. Awn very fine. Plant rather robust, over 60 cm. high.

8. *D. imbricata* J. Vickery.

2* Lower glume shorter than the upper, or the glumes subequal.

9. Panicle mostly contracted, either dense and spike-like, or, if rather loose, then the shorter branches of each cluster bearing spikelets almost from their bases.

10. Awn attached in the lower third of the lemma. Rhachilla produced beyond the floret, but variable in length and form, sometimes short and glabrous, at other times longer and hairy, and occasionally bearing a second lemma. Anthers 1.3-1.5 mm. long. Lemma equalling the lower glume, though usually slightly shorter than the upper.

11. Spikelets 4.5-6 mm. long, greenish or very slightly purplish. Leaves strongly inrolled, subsetaceous.

9. *D. monticola* (Roem. and Schult.) J. Vickery.

11* Spikelets 6-7 mm. long, strongly purplish in colour. Plants taller and more robust, up to 90 cm. Laminae only loosely convolute.

9a. *D. monticola* var. *valida* J. Vickery.

10* Awn attached above the lower third of the lemma.

12. Awn attached in the middle third of the lemma.

13. Spikelets usually over 5 mm. long. Lemma rather coarsely scaberulous.

14. Rhachilla produced into a rather long bristle (up to 2 mm. long) bearing fine hairs up to more than 1 mm. long. Awn exceeding the lemma by the length of the lemma, exserted. Lower glume either longer or shorter than the upper. Panicle 5-8 cm. long, sometimes slightly loose. Plant slender, erect. Leaves rather thin, acuminate. Internodes exceeding the sheaths.

6. *D. densa* Benth.

14* Rhachilla produced into a very short (0.5 mm.), fine, glabrous bristle. Awn not exceeding the lemma by more than half the length of the lemma, shortly exserted. Panicle about 8 cm. long, dense. Plant decumbent, rather coarse. Leaves rather thick, subobtuse, keeled at the apex, with a short, callus point. Internodes sometimes shorter than the sheaths.

10. *D. carinata* J. Vickery.

13* Spikelets usually under 5 mm. long.

15. Awn exceeding the lemma by about the length of the lemma, exserted. Rhachilla not, or very shortly produced. Panicle very short, 1-4 cm. x 4-6 mm., compact. Glumes broad. Lemma rather coarsely scaberulous with fairly conspicuous nerves. Plant small, 10-30 cm. high. Sheaths shorter than the internodes.

11. *D. minor* Benth.

15*. Awn not exceeding the lemma by more than half the length of the lemma. Rhachilla produced into a usually glabrous bristle.

16. Panicle dense, 5-8 cm. x 0.5-1.2 cm. Callus bearing fine hairs up to 1 mm. long. Culms stiff, erect, often over 1 mm. in diameter just below the panicle. Sheaths longer than the internodes. Leaves rather thick in the type, broad, flat, acute but not acuminate, 4-9 cm. x 4-6 mm., inrolled at the tips. Ligule about 1 mm. long.

12. *D. crassiuscula* J. Vickery.

16*. Panicle not dense, somewhat interrupted, 4-11 cm. x 4-5 mm. Callus bearing fine hairs up to 0.7 mm. long. Culms very slender, ascending, less than 0.5 mm. diameter just below the panicle. Sheaths much shorter than the internodes. Leaves very thin, 2-7 cm. x 1-2 mm. Ligule about 1 mm. long. Spikelets 3.5-4 mm. long.

13. *D.Rodwayi* J. Vickery.

12*. Awn attached just below the apex, or at least in the upper third of the lemma.

17. Spikelets less than 4.5 mm. long.

18. Awn as long as the lemma, much exserted. Spikelets under 4 mm. long. Panicle rather dense but the branches obliquely spreading. Rhachilla not produced into a bristle, or if so then very short and glabrous. Awn very fine. Lemma narrowly truncate with 2-4 fine teeth.

7. *D. appressa* J. Vickery.

18.* Awn shorter than the lemma, not or scarcely exserted.

19. Rhachilla not or scarcely produced. Panicle 8-16 cm. x 0.8-1.5 cm., very dense, cylindrical. Callus shortly bearded. Spikelets about 3.5 mm. long, greenish or straw-coloured. Awn very fine. Plant rather robust, over 60 cm. high. Leaves flat, 20-30 cm. x 3-5 mm., acute. Ligule about 3 mm. long.

8. *D. imbricata* J. Vickery.

19.* Rhachilla distinctly produced into a glabrous or hairy bristle.

20. Awn 1-2 mm. long, shortly exceeding the lemma. Panicle dense, 5-8 cm. x 0.5 1.2 cm. Glumes broad. Spikelets about 4 mm. long. Rhachilla shortly produced, more or less glabrous. Callus clothed with fine hairs up to 1 mm. long. Plant about 30 cm. high, with rather thick, broad, flat, acute leaves, 4-9 cm. x 4-6 mm., inrolled at the tips. Ligule about 1 mm. long. Culms stiff, erect, sometimes over 1 mm. in diameter just below the panicle. Sheaths sometimes longer than the internodes.

12. *D. crassiuscula* J. Vickery.

20.* Awn minute. Panicle loosely contracted, not very dense.

21. Rhachilla produced into a glabrous bristle. Spikelets about 2.5 mm. long. Glumes rather broad. Anthers 0.2-0.3 mm. long.

18. *D. contracta* (F. Muell.) J. Vickery.

21.* Rhachilla produced into a densely hairy bristle. Spikelets 3.5-4 mm. long. Anthers about 1 mm. long.

19. *D. microseta* J. Vickery.

17.* Spikelets 4-5, usually over 4.5, mm. long. Rhachilla very shortly produced, glabrous.

22. Callus naked. Awn rather thick, very short, not exceeding the lemma. Panicle sparsely branched, sub-cylindrical, 3-9 cm. x 4-6 mm. Glumes purplish. Plant rather slender, 30-50 cm. high. Leaves inrolled, those from the base 10-25 cm. x 1-3 mm., those from the culm much shorter. Ligule 1 mm. long.

20. *D. angustifolia* J. Vickery.

22*. Callus clothed with short hairs. Awn about as long as the lemma and much exceeding it, rather stiff, reflexed. Panicle rather loose and sometimes spreading, 8-17 cm. x 0.8-2 cm. Glumes often rather purplish. Lemma sparsely and finely scaberulous, rather acute or very minutely bifid at the apex.

22. *D. brachyathera* (Stapf) J. Vickery.

9.* Panicle usually more or less loose, with filiform, somewhat spreading or nodding branches which are naked for some distance at the base.

23. Awn placed in the middle third of the lemma, rarely higher.

24. Awn distinctly exceeding the lemma.

25. Anthers short, 0.5-0.6 mm. long. Rhachilla produced into a bristle about 1 mm. long, almost glabrous. Lemma prominently scaberulous, with inconspicuous nerves. Awn only shortly exceeding the lemma. Spikelets 3.5-4.2 mm. long. Plant rather slender. Panicle mostly 5-11 cm. long.

13. *D. Rodwayi* J. Vickery.

25.* Anthers 1.5-2.2 mm. long.

26. Panicle usually under 15 cm. long. Spikelets 4.5-5 mm. long. Glumes slightly unequal, the lower glume more than two-thirds as long as the upper. Awn shortly exceeding the lemma. Plant slender. Rhachilla produced into a bristle about 1 mm. long, usually hairy. Lemma prominently scaberulous.

14. *D. accedens* J. Vickery.

26.* Panicle about 25 cm. long. Spikelets 4.5-5.5 mm. long. Glumes rather broad, very unequal, the lower glume about two-thirds as long as the upper. Awn much exceeding the lemma. Rhachilla produced into a bristle about 1 mm. long with a tuft of hairs towards the apex. Lemma prominently and rather coarsely scaberulous. Plant rather robust.

15. *D. frigida* F. Muell. ex Benth.

24.* Awn short, not or only shortly exceeding the lemma. Rhachilla produced into a 0.8 mm. bristle bearing a tuft of short hairs at the apex. Lemma distinctly scabrous. Anthers 1.2-1.4 mm. long. Spikelets about 4 mm. long.

16. *D. Benthamiana* J. Vickery.

23*. Awn placed just below the apex, or at least in the upper third of the lemma, or absent.

27. Lemma distinctly and closely scaberulous.

28. Awn usually absent, or if present then exceedingly minute. Callus glabrous. Nerves of the lemma prominent. Rhachilla very shortly produced, glabrous. Anthers about 0.7 mm. long. Panicle 5-10 cm. long, laxly spreading, with few spikelets towards the ends of the branches. Branches 1-2.5 cm. long. Spikelets about 3 mm. long.

21. *D. nudiflora* J. Vickery.

28*. Awn usually present. Callus not entirely glabrous.

29. Awn minute, not or scarcely exceeding the lemma.

30. Panicle rather long, 9-30 cm., with lax branches.

31. Anthers 1.4-1.6 mm. long. Rhacilla produced into a 0.8 mm. bristle, usually hairy. Spikelets 3-3.2 mm. long.

17 *D. scaberula* J. Vickery.

31*. Anthers short, about 0.2-0.3 mm. long. Rhachilla produced into a glabrous bristle up to 0.8 mm. long. Spikelets about 2.5 mm. long. Glumes rather broad. Somewhat decumbent or ascending perennial.

18 *D. contracta* (F. Muell.) J. Vickery.

30*. Panicle short, 6-9 cm., with slender, rather stiffly spreading or contracted branches. Spikelets about 3.5 mm. long. Glumes unequal. Lemma scaberulous, equalling the lower glume. Rhachilla produced into a short, densely hairy bristle. Callus bearing hairs up to 1.2 mm. in length. Palea rather broad, scaberulous on the keels and for about half the distance between the keels and the margins. Plant rather small, with rather thin leaves.

19. *D. microseta* J. Vickery.

29*. Awn about as long as the lemma, strongly exserted, reflexed. Spikelets about 3 mm. long. Anthers 1.3-1.7 mm. long. Rhachilla produced into a rather long (about 1.4 mm.), hairy bristle. Lemma usually shortly exceeding the glumes. Panicle rather long, loose. Plant exceeding 50 cm. in height.

23. *D. reflexa* J. Vickery.

27*. Lemma sparsely scaberulous or comparatively smooth.

32. Awn exceeding the lemma by more than half the length of the lemma, rather thick, reflexed. Panicle fairly dense, 8-13 cm. long. Spikelets 5-5.5 mm. long. Lemma sparsely scaberulous, with distinct nerves. Anthers about 0.5 mm. long. Rhachilla very shortly produced, glabrous.

22. *D. brachyathera* (Stapf.) J. Vickery.

32*. Awn minute, very fine, not or scarcely exceeding the lemma. Panicle rather long, 9-30 cm., with lax or nodding, filiform branches. Spikelets 2-3 mm. long. Lemma rather thin, not or scarcely scaberulous, with rather prominent nerves, occasionally shortly exceeding the glumes.

33. Rhachilla not or scarcely produced. Callus shortly barbed with hairs.

24. *D. decipiens* (R.Br.) J. Vickery.

33*. Rhachilla produced into a bristle about 0.8 mm. long, bearing hairs up to 1.5 mm. long.

25. *D. parviseta* var. *Boormani* J. Vickery.

1*. Lemma distinctly and regularly longer than the second glume.

34. Panicle rather long, loose. Leaves flat. Plants exceeding 30 cm. in height.

35. Awn exserted, about as long as the lemma, reflexed. Spikelets about 3 mm. long. Lemma distinctly and closely scaberulous. Anthers 1.3-1.7 mm. long. Rhachilla produced into a rather long (about 1.4 mm.), hairy bristle.

23. *D. reflexa* J. Vickery.

35*. Awn very short, not or scarcely exceeding the lemma, placed very close to the summit of the lemma.

36. Lemma rather thin, not or scarcely scaberulous, with rather prominent nerves. Spikelets 2.5-3 mm. long. Anthers about 0.7 mm. long. Rhachilla not or scarcely produced.
24. *D. decipiens* (R.Br.) J. Vickery.

36*. Lemma distinctly and closely scaberulous.

37. Spikelets less than 4 mm. long. Awn 0.2-0.4 mm. long, not or scarcely exceeding the lemma.

38. Spikelets 1.5-2.5 mm. long. Anthers about 0.7 mm. long. Rhachilla produced into a bristle about 0.6-0.8 mm. long, which, together with the callus, bears fine hairs 0.3-1.5 mm. in length.
25. *D. parviseta* J. Vickery.

38*. Spikelets 3-3.8 mm. long. Rhachilla produced into a bristle about 1 mm. long, which, together with the callus, bears stiff hairs 0.2-1.2 mm. in length. Anthers about 1.3 mm. long.
26. *D. McKiei* J. Vickery.

37*. Spikelets about 5 mm. long, not very strongly laterally compressed. Awn about 0.7-1 mm. long, slightly exceeding the lemma. Rhachilla produced into a bristle about 0.8 mm. long, which, together with the callus, bears soft hairs 0.3-1.5 mm. in length. Anthers about 1.7 mm. long.
27. *D. acuminata* J. Vickery.

34*. Panicle short, with short, stiff, sub-spreading, usually trichotomously divided branches. Spikelets about 1.5 mm. long. Lemma twice as long as the glumes, smooth. Awn 0.2-0.7 mm. long, exceeding the lemma. Plants small, slender. Leaves filiform to setaceous.
28. *D. Gunniana* Benth.

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A Revision of the Genus *Typha L.* in New South Wales.

Alma T. Melvaine, B.Sc.

A detailed investigation of the material in the National Herbarium, Sydney, has been undertaken in order to determine the true identity of the numerous specimens of *Typha* (the bulrush, reed-mace, Cat's-tail or Cumbungi of common usage), of which two forms have been recorded from New South Wales. Three species have been recorded from Australia, and three correlated forms can be recognised in the material examined. All three are present in New South Wales, where only two have been previously recorded, but in the light of the evidence presented by large field collections, the third form, apparently that described by Graebner as *T. Basedowii,* is considered unworthy of specific rank. The two remaining forms are *T. Muelleri* Rohrb. and *T. angustifolia* L. var. *Brownii* (Kunth) Kronf. A number of habit forms can be recognised within these groups, three in *T. Muelleri,* and four in the var. *Brownii.* They are quite indistinguishable in floral characters, and indeed can be satisfactorily identified only in the field, but on account of the economic importance which the genus is assuming as a weed in the Australian irrigation areas, their separation seems desirable. Stature, spike size, and leaf colour form the basis of distinction of the habit forms, indicating the necessity for careful field records for herbarium specimens, if exact determination is required. Floral structure alone is sufficient to identify the two major groups. Floral structure also distinguishes the Australian material from *T. latifolia* L.; though the name has occasionally appeared in the literature, this species is not represented among the specimens examined.

Historical.

Robert Brown (1810) was the first botanist to identify an Australian species of *Typha,* naming it *T. angustifolia* L., but expressing doubt as to whether it was quite the same as the European species. Actually the New Zealand specimen which Forster (1786) identified as *T. latifolia* L. was possibly the same as Brown's, but both the descriptions are so inadequate that it is difficult to interpret them satisfactorily without examination of type specimens, and subsequent workers on the genus give no record of having seen Forster's specimen. Forster gave no character which would separate his specimen conclusively from *T. angustifolia.* Kunth (1841) later described Brown's plant as a new species. *T. Brownii,* but again the description was inadequate. The next description of an Australian form of *Typha* was much more detailed: this was Lehmann's (1844-5) account of a West Australian specimen. Lehmann identified this plant with the European *T. Shuttleworthii* Koch & Sond. and gave a full account of floral structure as well as of habit. Rohrbach (1869) pointed out that Lehmann's *T. Shuttleworthii* did not belong to that species, and having seen Brown's type, and deciding it was distinct, described Lehmann's plant as a new species, *T. Muelleri.* This author was the first to recognise the occurrence of two distinct forms of *Typha* in Australia; the one which he named *T. Muelleri* is a common and widely distributed form; the other (Robert Brown's plant) is somewhat less common, and is similar to *T. angustifolia* L. Rohrbach therefore placed it in that species with notes on its distinctive features. Mueller (1869-71) recorded the two forms, giving both specific rank, as *T. Muelleri* Rohrb. and *T. Brownii* Kunth, and derived part of his descriptions from those of Rohrbach.

In publications following those of Rohrbach and Mueller, various modifications of this nomenclature were used, (vide Kronfeld 1889, Graebner 1900, Maiden and Betche 1903 and 1916), or else the two forms were not recognised as distinct (vide Bentham 1878, Moore and Betche 1893, Black 1922, Bailey 1902, and Ewart 1930). These last authors described only the habit of the plants which were identified as a single species, *T. angustifolia* L. and regarded as showing great variations in size. The present nomenclature of the two forms recorded for New South Wales is that given by Maiden and Betche (1916), who recognise *T. angustifolia* L. var. *Brownii* Kronfeld and var. *Muelleri* Rohrbach.

Considerably later Graebner (1915) described a third species of *Typha* from an inland district in South Australia. Black (l.c.) remarks that this species, *T. Basedowii* is only a form of *T. angustifolia* L., and this is the only mention of it in Australian literature.

Floral Structure of the Genus.

Typha plants are monoecious, the unisexual flowers occurring in dense spikes on an aerial stem, the male spike above and more or less close to the female spike. The male flowers consist simply of (usually) three anthers borne on a common filament, from the base of which are given off a number of filamentous hairs of various forms. In some exotic species these hairs are missing. The pollen from the anthers of some species is peculiar in that it is always liberated in tetrads while in others it is freed as single pollen grains. This character is constant for nearly every species. With so few floral organs actually present, variations in the form of the male hairs and in the character of the pollen become of systematic importance.

The female flower is also very simple: it consists essentially of a pistil, the ovary of which is at first sessile on a short pedicel but later becomes gradually raised on a relatively long gynophore. The style is produced terminally into a brown, spathula-shaped, linear or rhomboid stigma. The pedicel bears a number of fine, colourless, silky hairs arising in irregular whorls. These hairs are usually simple acicular structures, but in a few exotic species take on distinctive forms which constitute a valuable systematic character. In a spike a number of the pistils may fail to develop normally, and the whole structure, except for the stigma and terminal part of the style, becomes swollen into a club-shaped, hollow organ known as the carpodium. When they occur singly in a flower, the carpodia occupy the central position which is normal for the pistil, but quite often two or three abortive female flowers occur adjacent to one another and become more or less fused together. In this case the carpodia do not seem to attain their full size, and appear like gynophoric hairs swollen for their whole length. Finally, in some species, each flower is subtended by a small hair-like structure which possesses an expanded and flattened end: this is known as the bracteole and arises from the axis independently of the pedicels. The cells of the expanded end usually become darkened by reddish or brown contents, so that the bracteole at maturity is dark brown in colour. Its shape varies slightly in different species. These bracteoles are the most definite feature of the flowers, and have led to the division of the genus by Kronfeld (loc. cit.) into two sections: Bracteolatae and Ebracteolatae. Each of these sections contains one of the two most common species: *T. angustifolia* is a bracteolate species while *T. latifolia* is ebracteolate.

Description of the Species.

TYPHA MUELLERI Rohrbach.

Rohrbach, in his description of this species, does not designate any one specimen, among those which he examined, as the type. Two of the specimens (or duplicates) cited by Rohrbach (Preiss No. 1874 from Mt. Eliza, W.A., and Mueller's specimen from Tanunda, S.A.) have been examined in the Melbourne Herbarium (Vic.); one of these specimens (W.A.) possesses a relatively narrow female spike, while the other (S.A.) has a much thicker spike. This is in accordance with observations made in the field, where the two forms, one slender and the other stout, seem to be constantly distinct; a third form, which differs from the stout type only in being much shorter in leaves, stems and spikes, can also be distinguished in the Irrigation Area of New South Wales. These three habit forms are, however, identical in their floral structure, and may therefore be retained under one species, *T. Muelleri.*

In those plants where the male flowers are present the pollen appears as single grains; the male hairs are for the most part widely expanded with several acute lobes terminally (Fig. 8), though a few are simple lanceolate structures. At maturity these hairs are reddish-brown in colour at their expanded ends.

The female flowers are confusing in the irregular occurrence of bracteoles (Fig. 6). The bracteolate European species *T. angustifolia* L. has a bracteole subtending each flower, so that in a small group of flowers removed for examination the numerous bracteoles are at once evident. In this Australian species, however, many of the flowers appear to be ebracteolate, even in the youngest flowering stages, and especially in the fruiting spikes, and in some specimens bracteoles are apparently absent altogether. In shape the bracteoles vary from lanceolate to narrow-lanceolate at the expanded, acute apex, sometimes with slightly crenulate edges, and are borne on very fine stalks of about the same thickness and length as the gynophoric hairs. In some of the larger spikes the bracteoles are 9 mm. long (Fig. 3). Sometimes the gynophoric hairs are slightly thickened apically, but they can be distinguished from the bracteoles by the fact that they arise from the pedicel and not from the spike axis. Cells of the bracteoles usually become darkened at maturity by reddish-brown contents, but occcasionally remain almost colourless.

Carpodia in this species are usually abundant, clavate in shape, occasionally very large, and many are slightly mottled with orange-brown patches, though this character is not constant. The fruit is a narrow, spindle-shaped structure from which the seed is easily separable, and the stalk which bears it (excluding the gynophore) may reach a length of 3 mm.

The small number and inconspicuous character of the bracteoles in these plants may explain why Lehmann (l.c.) states, in the detailed and accurate account he gives of Preiss's plant under *T. Shuttleworthii*: "bracteis nullis."

The three habit forms of *T. Muelleri* are characterised as follows:—

A. These plants are tall and robust, 2-4.5 m. in height; the maximum height is not reached until the plants are in the fruiting condition. The leaves are wide, usually at least 11 mm., but have been recorded up to 3 cm.; their colour is darker than in most other types and often appears bluish-green, there is a tendency for them to be concavo-convex in transverse section, though this is probably to be correlated with the width of the leaf. The male and female spikes are usually separated by a short interval but may be contiguous. The female spike measures 2-3.5 cm. in diameter in the fruiting stage, and at this time its colour changes from the cinnamon brown of the flowering stages to greyish fawn. This is the commonest form in the Irrigation Area of New South Wales. It is represented in the National Herbarium, Sydney, by a leafless specimen from Western Australia (Coll. R. W. Prunster, No. 5), and probably by a number of others not provided with details of the habit. It corresponds with Preiss's specimen No. 1874 in the Melbourne Herbarium. In the New South Wales Irrigation Area this form is early-flowering, beginning in the middle of November and continuing until the end of January.*

B. In stature these plants are smaller than those of A, reaching a height of 3 m. in the fruiting stage, though sometimes only 1.5 m. when flowering. Their leaves are rarely over 1 cm. wide, most commonly about 8 mm. but they have been recorded up to 15 mm. Field records state that they are a lighter shade of green than obtains in the leaves of A. The smaller width is probably responsible for the plano- to bi-convex shape of the leaf in section. Male and female spikes are almost always separated by an interval of 1 to 3 cm. In diameter the fruiting spike measures up to 1.75 cm. Few specimens are available in the fruiting stage, but these indicate that the female spike may remain cinnamon brown in colour and not change as in A. This second form has a wide distribution in New South Wales in both coastal and inland localities. It is represented in the National Herbarium, Sydney, by a number of specimens, including two collected by R. W. Prunster at Griffith (Nos. 1 and 2), and corresponds to Mueller's specimen from Tanunda, S.A., in the Melbourne Herbarium. It is generally a later flowering type, flowering from January to March, though occasionally appearing with A in mid-November.

C. This is recorded as the smallest of all the types in the New South Wales Irrigation Area. It grows only 1-1.5 m. in height, but has relatively broad spikes, which reach only 8-12 cm. in length. In the fruiting stage they are more yellowish-fawn in colour than the spikes of A. The leaves also are small, 4-5 mm. in width, and pale green in colour. Its flowering period extends from December to January.

TYPHA ANGUSTIFOLIA var. *BROWNII* (Kunth) Kronf.

This variety of *T. angustifolia* presents great variations, and although described before *T. Muelleri,* is apparently less abundant. The Australian form approaches closely to the European species *T. angustifolia* L. but Brown and Rohrbach both expressed doubt as to the absolute identity of the two plants. Rohrbach hoped to establish a distinctive character in the shape of cells of the testa, which he examined in other species, but he had no ripe fruits of the Australian form. He therefore concluded that its best position was in the European species, at least until some definite character could be established. Kronfeld, who separated Kunth's species as a variety, *T. angustifolia* var. *Brownii,* gave little data which is adequate to distinguish it, except the reddish-brown colour of the female spikes (the European plants are said to have darker brown spikes), and the often contiguous character of the spikes. In the exotic specimens in the New South Wales Herbarium, however, the majority of spikes of *T. angustifolia* have the same cinnamon brown colour, and male and female spikes are about the same distance apart as in the Australian specimens. Kronfeld remarks that his var. *Brownii* "ist nur wenig von *Typha angustifolia* verscheiden."

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* All flowering periods cited subsequently are for the Irrigation Area of New South Wales.

Graebner (1900) followed Kronfeld in distinguishing the Australian plants on their often contiguous spikes, but gave no other reasons for separation and placed them in a proles *Brownii,* apparently included in the subspecies *T. eu-angustifolia* Graebner.

It is thought that the Australian specimens are best left with their present nomenclature, i.e. as *T. angustifolia* L. var. *Brownii* (Kunth) Kronfeld, following the authors who, being familiar with the European type, considered the Australian plant not definitely identical.

The only feature of these specimens which does not completely agree with descriptions of the var. *Brownii* is the *rare* contiguity of male and female spikes, even in the considerable number of specimens available for this investigation. Rohrbach's description, which is the earliest adequate description, and was drawn up from Brown's type, states that the spikes are often contiguous.

Some of the forms of the var. *Brownii* are very similar in appearance to form B of *T. Muelleri,* and indeed the plants would be indistinguishable without an examination of the floral structure. The floral structure in var. *Brownii* (Figs. 4 and 5) is constant in all forms and thus constitutes the critical distinction from *T. Muelleri*: each flower is subtended by a distinct bracteole, so that, as in the European *T. angustifolia* these structures are at once evident, by virtue of their numbers, in a small group of flowers.

The bracteoles are spathulate in outline (Fig. 2), and are provided with stouter stalks than those in *T. Muelleri.* The expanded apex is cuneate-acute, tapering gradually into the stalk: this is the condition described by Kronfeld as "sensim dilatatu." Rohrbach records the bracteoles as being "zuweilen nach oben nur schwach keulig verdickt": a few specimens show bracteoles of this type, which actually approach those of *T. Muelleri* in shape, but are always present in greater numbers.

Four habit forms have been distinguished in the field:—

A. These plants grow only to a height of 1.5-2 m. and usually measure 1 m. in the flowering stage, which occurs about the end of November. The female spike is cinnamon brown in colour throughout its existence—a feature characteristic of all four forms of the var. *Brownii.* In the flowering stage the spike measures about 1 cm. in diameter, increasing to 1.5 or almost 2 cm. when in fruit; in length it is usually about 24 cm. The leaves are of a relatively dark shade of green, and narrow, about 8 mm. being the average width. The male hairs are very broad and much divided, but it is not certain that this is a satisfactory criterion for distinction of any form. The spikes in this form are similar to those of *T. Muelleri* A at the flowering period, but the plants can usually be distinguished by their general stature.

B. Differs from A considerably, though the floral structure in the young spikes is identical. The plants grow to a greater height, 2.5-3 m. being general, and have leaves of about the same width as in A, but lighter in colour. The spike, though the same colour, is longer and narrower at maturity than in A; some spikes are 40 cm. in length. Flowering takes places at about the same time or slightly later than in A. The hairs of the male inflorescence are mostly simple lanceolate structures. It is practically impossible to separate this form from *T. Muelleri* B on external characters, since that form of *T. Muelleri* may retain the cinnamon brown spike at maturity; spike diameter is the same, as well as leaf width and colour. Spikes in var. *Brownii* B are, however, usually much longer than in form B of *T. Muelleri.*

C. This form comprises plants with the small stature of A, 1 m. in height during flowering, and extending to 1.5 and 2 m. in the fruiting stage. The spike is relatively narrower and shorter than any of the other forms of var. *Brownii,* measuring usually about 12 cm. long, but up to 20 cm., and 1 cm. or less in diameter, in the early fruiting stage.

The first specimens of this form which were examined bore very young spikes and were apparently rather exceptionally small plants, being 1 m. or slightly less in height. The female spike measured only 10-14 cm. in length and about 1 cm. in diameter at maturity, being considerably narrower in the young flowering stages (5-6 mm. diam.). Leaves were very narrow, in one specimen 2-3.5 mm., in another 5-6 mm. in width. The spikes were never contiguous in these four specimens; two of these were from Yenda in the New South Wales Irrigation Area and two from South Australia (Mt. Lyndhurst and Strangway Springs). Hairs of the male inflorescence, where present, were mostly simple, narrow lanceolate structures, though persistent examination revealed some of the expanded and divided type. Pollen grains were smaller than in *T. Muelleri* (Fig. 7). These four specimens are considered to belong to the form described by Graebner (1915) as a new species for South Australia, *T. Basedowii.* This author records long, narrow-linear male hairs, twisted in an eel-like fashion, with an acute apex. This twisting was not seen in any of the specimens examined, but occurs occasionally in stigmas and gynophoric hairs of any species when growth is obstructed by overcrowding of the flowers. Anther filaments may also show such a twisting. Graebner himself apparently saw only the flowering plants and gives no measurements for the fruiting stage when all forms typically show a considerable increase in height and in spike size. Since the specimen from Strangway Springs has a fruiting spike under 1 cm. in diameter, some plants evidently reach the fruiting stage with very narrow spikes, but unfortunately no information regarding the height of this specimen is available. Graebner gave no details about the shape of the bracteoles in his species, but in the four specimens just described the bracteoles are typically those of the var. *Brownii* (Figs 1 and 4), with shorter stalks in accordance with the narrower spike. From an examination of many specimens it seems probable, therefore, that *T. Basedowii* was based on an immature form of the var. *Brownii* C, the specimens of which differ only in being slightly larger at maturity.

Occasional variations are found in the shape of the bracteoles, which approach the narrower form typical of *T. Muelleri,* but the large number present is sufficient to distinguish the plants. Examination of a considerable number of specimens, too, shows that the character of simple male hairs is not constant, as many of them are expanded and divided as in A.

D is only slightly different from B, but is distinguishable in the field. In height it approaches B, being 2-3 m. at maturity, and it resembles B also in the light or greyish green colour of the leaves, which vary from 8 to 11 mm. in width. The spike is long (20-30 cm.) but wider than in B, being up to 2 cm. in diameter when in fruit. Bracteoles are of the form typical for the variety, and the male hairs, where present, are mostly of the simple lanceolate type, although a few divided ones may be present. It is later-flowering than the other forms of var. *Brownii,* the season extending into January.

Thus the variations shown by *T. angustifolia* var. *Brownii* seem to indicate that the form described as *T. Basedowii* should be included in that variety as an extreme form which is distinguishable at maturity but not readily in the younger stages.

Summary of Characters of the Forms.

TYPHA ANGUSTIFOLIA var. BROWNII.

Bracteoles broad, numerous.

A Plants 1.5-2 m. high in fruit; leaves dark green, about 8 mm. wide; spikes long, about 24 cm., rather wide, in fruit up to 2 cm. diam.; male hairs broad and much divided. Flowering: Late November.

B Plants 2.5-3 m. high in fruit; leaves light green, 8-12 mm. wide; spike very long, up to 40 cm., relatively narrow, 1.5-1.8 cm. diam. in fruit; male hairs mostly simple, lanceolate. Flowering: Late November to mid-December.

C Plants 1.5-2 m. high in fruit; leaves light green, often very narrow, 2-7 mm.; spike short, usually 10-14 cm. long, narrow, not over 1 cm. diam. in fruit; male hairs simple or divided. Flowering: Mid-November to mid-December.

D Plants 2-3 m. high in fruit; leaves light or greyish green, 8-11 mm. wide; spike 20-30 cm. long, 2.0 cm. diam. in fruit; male hairs mostly simple, lanceolate. Flowering: Late December to early January.

TYPHA MUELLERI.

Bracteoles narrow, few.

A Plants 2-4.5 m. high in fruit; leaves dark bluish-green; leaves broad, 1·2-3 cm. wide; spike about 20 cm. long, greyish-fawn in fruit; spike very broad, 2-3 cm. diam. in fruit; male hairs much divided. Flowering: Late November and December.

B Plants usually 2-2.5 m. high in fruit; leaves light green; leaves narrower than in A, usually 8 mm., up to 1.5 cm. wide; spike shorter, 16 cm. long; spike slender, not more than 1.75 cm. diam. in fruit; male hairs simple or much divided. Flowering: January to March.

C Plants very short, about 1-1.5 m. high in fruit; leaves light green; leaves 4-5 mm. wide; spike short, 8-12 cm. long; spike broad, 1.5 cm. diam. in fruit; male hairs fallen from these specimens. Flowering: December to January.

Author's Descriptions.

Since there is no copy of the publications containing them readily available in Australia, it may be of some value to Australian botanists to give here the original or early descriptions of the three forms of *Typha* previously recorded for Australia. The original of *T. Basedowii* is included for completeness.

Typha angustifolia var. *Brownii* (Kunth) Kronfeld.

This excerpt is taken from Rohrbach's (l.c.) remarks under *T. angustifolia* and refers to Australian, Tasmanian and New Zealand specimens. Rohrbach saw Robert Brown's type specimen and this is the first adequate description of the type, though the original was published some time earlier (Brown, 1810).

Zwischenraum zwischen der männlichen und weiblichen Infloreseenz nicht selten fehlend. Axenhaare des männlichen Blüthenstandes rothbraun, breit bandartig, nach oben stark verbreitert und mehrzipflig. Trablätter der weiblichen Blüthen zuweilen kürzer als die Perigonhaare, zuweilen nach oben nur schwach keulig verdickt. Blätter aussen nur sehr schwach convex, innen flach etwa 10 mm. breit.

Typha Muelleri Rohrbach.

This is the original description drawn up apparently from a number of Herbarium specimens, among them Preiss's No. 1874 from Western Australia, and Mueller's specimen from Tanunda, South Australia.

Männlicher und weiblicher Blüthenstaud meist mit, selten ohne Zwischenraum. Männlicher Blüthenstand mit Haaren, dieselben rothbraun, bandförmig, einfach zugespitzt oder oben stark verbreitert und mehrzipflig; Pollenkörner stets einzeln. Weiblicher Blüthenstand braun, weiss gefleckt, zur Fruchtreife silbergrau, 10-35 cm. lang und kürzer als die männliche. Blüthe mit einem Tragblatt, dieses sehr schmal linealisch, an der Spitz plötzlich eiförmig verbreitert, zugespitzt, gekerbt, ebenso lang als das Perigon oder etwas kürzer. Frucht sehr lang spindelförmig, mit einer Längsfurche, im Wasser aufspringend; Samen mit der Fruchtschale nicht verwachsen. Zellen der Maschenschicht stets mit grösserem tangentialen als radialen Durchmesser, auf der Innenseite mit sehr schwacher Wandverdickung—Blätter an den Schieden meist biconvex, höher hinauf aussen convex, innen flach, 5-10, die untern bis 20 mm. breit, an den blühenden Trieben die Inflorescenz überragend.

Typha Basedowii Graebner.

This is the original description but I have no information about the actual type specimen except that it was collected in South Australia.

Planta gracillima ca. 3-5 dm. alta. Rhizoma repens tenue. Folia angustissima, 3-5 mm. lata, dorso convexa, supra plana, distincte linearia, subincrassata, basi sensim vaginantia. Spicae 1-1,5 dm. longae, angustissime cylindraceae, remotae. Spicae femineae (florentes) 3-4 mm. latae, pallide brunneae, bracteolatae. Flores feminei stigmatibus linearibus vel lineari-lanceolatis instructi. Spicae masculae pilis longis anguste linearibus anguillulae modo revolutis, apice acutatis instructae. Pollen minimum, simplex.

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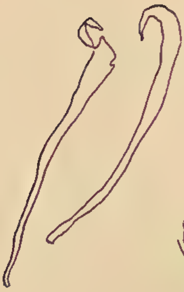
*My thanks are due to Miss J. W. Vickery for forwarding from London extracts from this paper, unobtainable in Australia, and to Mr. R. W. Prunster for specimens and much valuable information derived from field observations.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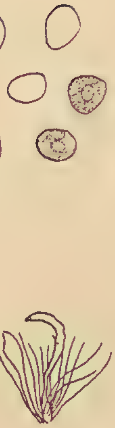
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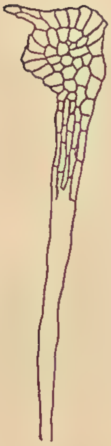
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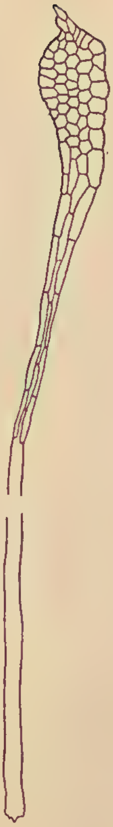
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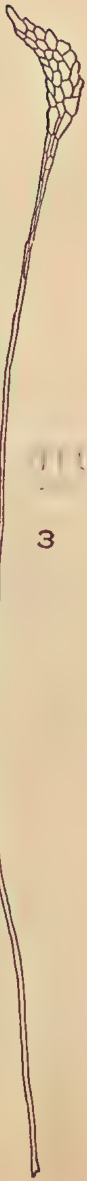
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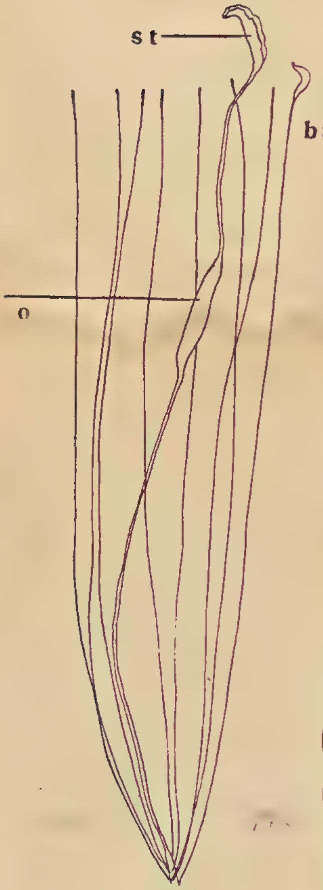

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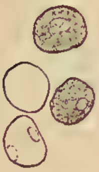

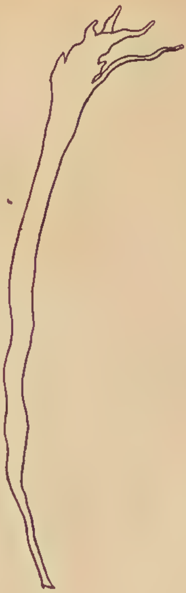
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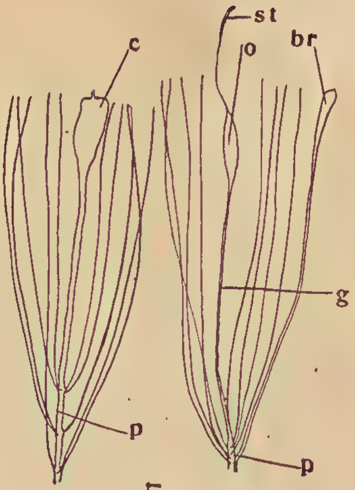

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Explanation of the Figures.

Fig.

1. *Typha angustifolia* var. *Brownii* C—bracteole.
2. *Typha angustifolia* var. *Brownii* A—bracteole. (Half length omitted.)
3. *T. Muelleri*—bracteole. (Two-thirds length omitted.)
4. *T. angustifolia* var. *Brownii* C—Flower, very young stage.
5. *T. angustifolia* var. *Brownii* A—Flowers, early fruiting stage. Flower on left with carpodium.
6. *T. Muelleri*—Flower, early fruiting stage.
7. *T. angustifolia* var. *Brownii* C—Hairs from male inflorescence and pollen grains.
8. *T. Muelleri*—Hairs from male inflorescence and pollen grains.

br bracteole, *c* carpodium, *g* gynophore, *o* ovary, *p* pedicel, *st* stigma.

Figs. 1–3 X42, Figs. 4–6 X10, Figs. 7 and 8 : Hairs X17, Pollen X200.

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A Comparison Between Marine Floras.

By VALERIE MAY, B.Sc.

The dissimilarity between the land flora of Australia and that of the rest of the world has aroused much interest. Apparently, however, no examination has been made of the relationships between the marine algal floras surrounding this and other countries. In the present paper an attempt has been made to compare the marine *Chlorophyceae* and *Melanophyceae* (*Phaeophyceae*) of Britain, the Pacific Coast of North America, Australia and New Zealand.

As a means of expressing the degree of relationship between these areas, Jaccard's Coefficient of Correlation has been used. This measure of similarity between any two places is obtained by dividing the number of species common to both places by the total number of species occurring in both places; *i.e.*,

$$\text{Coefficient of Correlation} = \frac{\text{Number of species common to both places.}}{\text{Total number of species in both places.}}$$

Newton's (1931) work has been consulted in order to obtain records of the species occurring in Great Britain. For the species of the Pacific Coast of North America, Setchell and Gardner (1920,1925), and for the species of New Zealand, Laing (1927), have been followed. For Australia the following references have been consulted: Lucas (1909-1936), and May (1938-1939). The list of species from Australia has been increased further by an examination of the named Algae in the National Herbarium, Sydney, and in the Lucas Collection now in the herbarium of the Council for Scientific and Industrial Research, Canberra; it has been assumed that the identification of a plant in either of these collections was accepted by the late Prof. A. H. S. Lucas (see May, 1938, p. 209). When there have been found in either collection plants which have not been recorded previously from Australia, these are included in Tables I or II of this paper, and a footnote appended giving the name, the State where found, and the herbarium from which the information was obtained.

The names and synonyms used in the references quoted above have been accepted; where differences exist, preference has been given to the most recently published works. One exception has been made to this general rule in that the nomenclature used by De Toni (1889, 1895) has been followed for the plants recorded in New Zealand, because Lucas largely followed this authority in his work on the Australian Algae. Van Bosse's (1898) nomenclature has been accepted in regard to the naming of all species of the genus *Caulerpa*.

Tables I and II show the number of species in each genus which occur in the localities under consideration. Genera represented in the areas examined by two species or less have been neglected, since our knowledge of the Algae occurring in Australia, at least, is too meagre to justify the consideration of such genera.

From Tables I and II the following Coefficients of Correlation have been derived:—

Coefficient of Correlation.	Chlorophyceae.	Melanophyceae.
	per cent.	per cent.
New Zealand : Australia	14·4	15·4
New Zealand : Britain	10·4	5·3
New Zealand : North America	7·4	2·9
Australia : Britain	9·4	6·3
Australia : North America	8·1	2·3
Britain : North America	22·2	7·3

The slight difference between the Coefficients of Correlation of *Chlorophyceae* of New Zealand: Australia (14.4 per cent.), and of New Zealand: Britain (10.4 per cent.) is noteworthy. Further, correlation tends to be higher among the *Chlorophyceae* than among the *Melanophyceae*.

Using the Tables given by Barton (1893, p. 210), the following Coefficients of Correlation have been obtained:—

Coefficient of Correlation.	Chlorophyceae.	Melanophyceae.	Rhodophyceae.
	per cent.	per cent.	per cent.
Australia : Cape of Good Hope	7·3	6·4	6·1

These figures show that the correlation that exists between the Algae of Australia and of the Cape of Good Hope is of the same order as that existing between the Algae of Australia and of other parts of the world (see Tables I and II).

A genus such as *Caulerpa* (see Table I), represented by many species in Australia and New Zealand but absent from America and Britain, suggests that the Australasian marine flora is isolated. However, although the genus *Caulerpa* (Van Bosse, 1898) reaches a very high degree of specialisation in Australasian waters, it is by no means confined to them, but flourishes throughout tropical and subtropical zones. The above fact supports the statement that Australian Algae do not show any unusually high degree of endemism.

There are two possible explanations of the apparent uniformity that exists among the Algae of the different areas examined. The continuity and relative uniformity of the ocean, together with past changes in the disposition of ocean land masses, may have allowed the development of similar marine floras at places which have similar climatic conditions; in this case, uniformity would be assisted by the distribution of zooids, or of mature plants carried by objects such as floating logs or ships. On the other hand, our taxonomic work may be so confused that different species in different countries are known by the same name, and ultimately it may be shown that the relationships are less close than appears at present.

TABLE I.—*Chlorophyceae.*

Genus.	New Zealand.	Australia.	Britain.	America.	New Zealand–Britain.	New Zealand–America.	Australia–Britain.	Australia–America.	Australia–New Zealand.	Britain–America.
Acetabularia	...	5	...	...	...	...	...	...	...	...
Avrainvillea	...	4	...	...	...	...	...	...	...	...
Bryopsis	2	7	2	4	1	1	2	2	1	2
Caulerpa	5	32	...	...	...	...	...	...	5	...
Chætomorpha	3	8	5	7	1	...	2	1	1	2
Chlorochytrium	...	...	4	3	...	...	...	...	...	1
Cladophora	12	21	32	24	2	1	4	3	2	8
Codiolum	...	...	3	2	...	...	...	...	...	2
Codium (¹)	4	17	4	6	2	2	2	2	3	1
Derbesia (²)	...	2	1	2	...	...	...	1	...	...
Dictyosphæria	...	3	...	...	...	...	...	...	...	...
Endoderma	...	...	4	1	...	...	...	...	...	1
Enteromorpha (³)	7	10	13	15	4	4	6	6	7	8
Gomontia	1	...	2	4	1	1	...	...	...	1
Halimeda (⁴)	...	9	...	1	...	...	...	...	...	...
Hormiscia	...	...	...	7	...	...	...	...	...	...
Monostroma (⁵)	1	1	9	8	...	...	...	...	1	5
Percursaria	1	1	1	1	1	1	1	1	1	1
Prasiola	...	...	2	5	...	...	...	...	...	1
Pseudulvella	...	...	...	3	...	...	...	...	...	...
Rhizoclonium	2	1	6	6	...	...	1	1	...	2
Struvea	...	3	...	...	...	...	...	...	...	...
Udotea	...	4	...	...	...	...	...	...	...	...
Ulothrix	...	...	3	4	...	...	...	...	...	2
Ulva (⁶)	5	4	2	11	1	1	2	2	2	2
Ulvella	...	...	3	1	...	...	...	...	...	1
Urospora	1	...	3	...	1	...	...	...	...	...
Valonia	...	6	...	...	...	...	...	...	...	...
Vaucheria (⁷)	...	1	6	...	...	...	1	...	...	...
Total	44	139	105	115	14	11	21	19	23	40

(¹) Includes *C. contractum* Kjellm.—Queensland—National Herbarium, Sydney; also *C. Harveyanum* Setchell—Queensland—C.S. & I.R., Canberra.

(²) Includes *D. Lamourouxii* (J. Ag.) Sol.—South Australia— C.S. & I.R., Canberra.

(³) Includes *E. plumosa* Keutz.—Tasmania—C.S. & I.R., Canberra.

(⁴) Includes *H. papyracea* Zan.—West Australia—C.S. & I.R., Canberra.

(⁵) Includes *M. expansum* G. S. West—Victoria—C.S. & I.R., Canberra.

(⁶) Includes *U. fasciata* Delile—N.E. Australia—C.S. & I.R., Canberra.

(⁷) The species of *Vaucheria* which occur on the Pacific Coast of North America have not been identified as yet (Setchell and Gardner, 1920).

TABLE II.—*Melanophyceae* (*Phæophyceae*).

Genus.	New Zealand.	Australia.	Britain.	America.	New Zealand–Britain.	New Zealand–America.	Australia–Britain.	Australia–America.	Australia–New Zealand.	Britain–America.
Alaria	...	...	1	9	...	...	...	...	...	...
Ascocyclus	...	...	3	...	...	...	...	...	...	...
Asperococcus	...	2	4	...	...	...	1	...	...	...
Bactrophora	...	4	...	...	...	...	...	...	...	...
Blossevillea (¹)	10	24	...	1	...	...	...	...	10	...
Carpoglossum	...	3	...	...	...	...	...	...	...	...
Carpomitra	2	2	1	...	1	...	1	...	1	...

[Continued on next page.]

Table II.—*Melanophyceae (Phaeophyceae)*—*continued.*

Genus.	New Zealand.	Australia.	Britain.	America.	New Zealand–Britain.	New Zealand–America.	Australia–Britain.	Australia–America.	Australia–New Zealand.	Britain–America.
Carpophyllum	4	1	...	...	...	...	...	...	1	...
Castagnea	...	1	3	...	...	...	1	...	...	...
Chilionema	...	1	3	...	...	...	1	...	...	...
Chordaria	1	3	2	3	1	1	...	...	...	1
Coilodesme	...	...	...	7	...	...	...	...	...	...
Compsonema	...	...	...	17	...	...	...	...	...	...
Cystophyllum	...	2	...	1	...	...	...	...	...	...
Cystoseira	1	2	4	3	...	...	...	...	1	...
Desmarestia	2	1	4	10	1	1	1	1	1	1
Dictyosiphon	...	...	5	3	...	...	...	...	...	2
Dictyota	3	18	2	6	1	...	1	...	3	...
Dilophus	...	11	...	...	...	...	...	...	...	...
Ecklonia	3	3	...	...	...	...	...	...	1	...
Ectocarpus	2	6	39	32	1	1	4	2	1	6
Elachistea	...	1	5	2	...	...	...	...	...	...
Fucus	...	...	5	5	...	...	...	...	...	...
Hecatonema	...	...	5	3	...	...	...	...	...	...
Homœostrichus	2	4	...	...	...	...	...	...	1	...
Hormosira	1	3	...	...	...	...	...	...	1	...
Ilea	1	1	3	1	1	1	1	1	1	1
Laminaria	...	...	4	11	...	...	...	...	...	1
Leathesia	1	1	2	3	1	1	1	1	1	1
Lessonia	2	1	...	...	...	...	...	...	...	...
Litosiphon	...	...	4	...	...	...	...	...	...	...
Lithoderma	...	...	2	2	...	...	...	...	...	1
Mesogloia (²)	1	1	4	...	...	...	...		1	...
Myriactis	...	...	4	...	...	...	...	...	...	...
Myrioderma	1	7	...	...	...	...	...	...	1	...
Myriogloia	1	1	...	1	...	...	...	...	...	...
Myrionema	1	1	6	14	1	1	1	1	1	3
Myriotrichia	...	...	4	...	...	...	...	...	...	...
Neurocarpus (³)	...	7	1	1	...	...	1	...	...	...
Pachydictyon	...	3	...	...	...	...	...	...	...	...
Padina	...	4	1	1	...	...	1	...	...	...
Punctaria	...	1	6	7	...	...	1	1	...	1
Pylaiella	1	1	1	4	1	1	1	1	1	1
Ralfsia	...	...	5	5	...	...	...	...	...	2
Sargassum	7	80	...	17	...	...	...	1	5	...
Spathoglossum	...	3	...	...	...	...	...	...	...	...
Spermatochnus (⁴)	...	3	2	...	...	...	2	...	...	...
Sphacelaria	2	7	9	6	1	...	3	1	1	2
Spororchnus	1	11	1	...	...	...	1	...	...	...
Stictyosiphon	...	2	2	1	...	...	...	...	...	1
Stilophora	1	2	2	...	1	...	1	...	1	...
Streblonema	...	...	10	15	...	...	...	...	...	...
Stypocaulon	2	2	1	...	...	...	...	...	2	...
Taonia	1	1	1	1	...	...	...	...	1	...
Turbinaria	...	5	...	...	...	...	...	...	...	...
Xiphophora	2	3	...	...	...	...	...	...	2	...
Zonaria	1	3	...	1	...	...	...	...	1	...
Total	57	243	161	193	11	7	24	10	40	24

(¹) Includes *B. laxa* Sond.—Victoria—National Herbarium, Sydney; also *B. micromera* Ag.—Victoria—C.S. & I.R. Canberra.

(²) Includes *M. intestinalis* Harv.—Tasmania—C.S. & I.R., Canberra.

(³) *Neurocarpus* Webb. and Mohr., *Haliseris* Targ. Tozz. or *Dictyopteris* Lamour.

(⁴) Includes *S. paradoxus* (Roth.) Kuetz.—West Australia—National Herbarium, Sydney.

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A Revision of the Australian Species of *Agrostis* Linn.

JOYCE W. VICKERY, M.Sc.

Introduction.

In a previous paper (Vickery, Contrib. Nat. Herb. N.S.W., 1, No. 2, 1940, p. 43) the writer discussed the status and limits of the genera *Agrostis* Linn., *Calamagrostis* Roth and *Deyeuxia* Clar. ex Beauv., and pointed out that the Australian species, which have been variously attributed to these three genera, appear to fall into two groups belonging to *Agrostis* and *Deyeuxia* respectively.

The species belonging to *Agrostis* may be distinguished by the membraneous, often very thin and usually smooth or villous lemma, rather broadly truncate at the apex with or without fine teeth, the hairs of the callus not exceeding the lemma in length, and, at least in most Australian species, the more capillary, spreading panicle. The prolongation of the rhachilla beyond the lemma, which has frequently been used to separate the genera, appears an unsatisfactory character, the use of which would make for a very unnatural division of the species. It is frequently variable even within the one species.

Since the publication of Bentham's Flora Australiensis (vol. vii, 1878), several new species have been described, some changes in nomenclature necessitated, and much more material collected. It seemed advisable therefore to collect and co-ordinate our present knowledge of the genus in Australia in the present revision. Only indigenous species have been considered here.

In most cases it has been possible to examine the type specimen or other authentic specimen of each species. Under each species the Type or Type Number is indicated, and the herbarium where it may be found is indicated as follows:—B.M., the British Museum of Natural History; C., the Herbarium of the Department of Botany, Cambridge; K., the Herbarium of the Royal Botanic Gardens, Kew; S., the National Herbarium, Sydney. Every specimen cited has been examined by the writer.

The writer would like to take this opportunity of expressing her thanks to Mr. C. E. Hubbard for much advice and helpful criticism during the progress of the work, and to the Director, Royal Botanic Gardens, Kew, the Keeper of Botany, British Museum of Natural History, and the Professor of Botany, Cambridge, for their courtesy in allowing her to examine type specimens and other material contained in the herbaria under their charge.

Enumeration of Species.

1. *Agrostis hiemalis* (Walt.) B.S.P., Prel. Cat. N.Y. (1888), p. 68.

Syn.: *Cornucopiae hyemalis* Walt., Fl. Carol. (1788), p. 73. *Agrostis scabra* Willd., Sp. Pl. I. (1797) p. 370, non R. Br. (1810). *Agrostis scabra* var. *elatior* Benth. Fl. Austral. vii (1878) p. 576 pro parte. For further information on the synonymy of this widespread American species, see A. S. Hitchcock, Manuel of the Grasses of the United States (U.S. Dept. Agr. Miscell, Publ. 200, 1935, p. 781-2).

Erect or geniculate-ascending, loosely tufted, glabrous perennial, sometimes with a rather short horizontal rhizome, about 40-80 cm. high; culms about 4-noded, slender, scaberulous, the internodes usually slightly longer than the sheaths; nodes glabrous; sheaths densely scaberulous to scabrous between the nerves; ligule membraneous, jagged, scaberulous, 2-5 mm. long; blades flat or becoming involute towards the tip, scabrous on the nerves, grooved on the upper surface, acuminate, 3-15 x 1.5-4 mm.; panicle 10-35 cm. long, ovate-lanceolate in outline, spreading, with 2- to 6-nate, subverticillate capillary branches, the internodes between the lower branches 2-5 cm. long, the branches bare and undivided at the base for 1-5 cm., then again 2-3 times 3-nately divided; rhachis scaberulous, the branches and pedicels scabrous; spikelets produced towards the ends of the ultimate branches, 1.5-2.5 mm. long, often strongly purplish-coloured; glumes subequal or the lower slightly longer, slightly keeled on the upper part, slightly scabrous on the keels, sometimes hyaline towards the margins; lemma membraneous, glabrous, smooth, faintly 5-nerved, unawned, truncate or minutely toothed, shorter than the glumes; palea very minute or absent; callus bearing a few very short hairs; rhachilla not produced; anthers 3, linear-oblong, up to 1.5 mm. long in some specimens, shorter in others; caryopsis narrow oblong.

With some hesitation I have placed the following Australian specimens with the widespread and variable American species, *Agrostis hiemalis.* I have included them in this paper together with the indigenous Australian species since the localities in which many of them have been collected suggest the possibility that the species may also be a native of Australia. Some of the specimens appear to differ from the typical *A. hiemalis* in the presence of a short horizontal rhizome, the shorter panicle branches divided below the middle, and in the large anthers which almost completely fill the lemma just before anthesis. Until a more complete range of specimens of the numerous American forms can be studied, however, it seems wisest to include the Australian specimens here.

Loc.: New South Wales: Glen Elgin, J. White-Haney, No. 19, 4.4.1930, and No. 7, 24.2.1930; Boonoo Boonoo, J. L. Booman, 2.1905; 5 miles west of Black Mountain, near Guyra, 4,300 feet, E. N. McKie, No. G., 1929; Elderbury Creek, Guyra, E. N. McKie, No. 329, 1.1930; Black Mountain to Booroolong Road, Guyra district, E. N. McKie, No. 404, 10.4.1931; Inverell, A. E. Thomas, 1.1913; Walcha district, A. R. Crawford, 6.1900; Barrington Tops, in swamp, 4,500 feet, J. Vickery, 1.1930; Wingello, J. H. Maiden, 3.1900; Tallwong, W. Forsyth, 1.1900; Mt. Kosciusko, R. Helms, 2.1901; Mt. Kosciusko, J. Vickery, 1.1930.

Victoria: One Tree Hill, near Kallista, in shady, moist situations, J. Vickery, 22.1.1935; Sources of the Goulburn, F. Mueller; Red Jacket Creek, Garguevich, Herb. F. Mueller; Orbost, C. H. Grove, No. 1194, 2.1905; Acheron Way, in wet forest, J. Vickery, 19.1.1935; Acheron Way, Dandenong Range, at roadside, S. T. Blake, No. 7258, 19.1.1935.

Tasmania: Without exact locality or number, Gunn (mixed with *Agrostis aequata* and *A. venusta*); Dromedary Swamp, L. Rodway, 1.1894.

Very similar in spikelet characters to *A. parviflora* R. Br., from which it differs in the tall habit, leafy culms, and much larger, capillary panicle which is less stiffly spreading. Bentham included under the var. *elatior* other specimens which agree with typical *Agrostis parviflora* R. Br. It is unlikely that the latter species occurs further north than the Australian Alps. The specimen New England, C. Stuart, cited by Bentham, consists partly of *Deyeuxia McKiei* J. Vickery and partly of *Agrostis avenacea* Gmel.

2. *Agrostis parviflora* R. Br., Prod. (1810) p. 170 (Figured in Hook. f., Fl. Tas. ii (1860) p. 158.)

Syn.: *Vilfa parviflora* (R. Br.) Beauv., Agrost. (1812) p. 16.
Agrostis intricata Nees in Hook. Lond. Journ. Bot. ii. (1843) p. 413.

Loc.: New South Wales: Mt. Kosciusko, 6,000 feet, in swampy ground, J. Vickery, 14.1.1940.

Victoria: Dandenong Ranges, F. Mueller.

Tasmania: Adventure Bay, in black vegetable soil, Nelson, Feb. 1792 (Type B.M.); Hobart, G. Caley, December, 1805; Russel Falls, E. Cheel, 3.1910; Mt. Wellington, Gunn, No. 1499, 1.3.1839; Shipwright's Point, S. Huon, Oldfield, No. 123; Side of Western Mountains, 2,000 feet, Gunn, No. 1448, 16.1.1845; Base of Mt. Wellington, Gunn, No. 1448, 7.1.1841 in part; Mt. Wellington, L. Rodway, 12.1891; Van Diemen's Land, Gunn, No. 1011 in part (type of *Agrostis intricata* Nees. C.). Top of Blue Tier, 2,500 feet, Tate Herbarium.

Very slender, weak, glabrous, erect or ascending, loosely tufted annual, usually 15-35 cm. high; culms finely striate, very slender, about 2-noded; nodes glabrous; leaves crowded at the base, short, very fine; sheaths becoming loose from the culms in the upper part, adpressed below; ligule membraneous, obtuse, 1-2 mm. long; blades mostly inrolled-filiform when dry, scabrous on the margins, 0.25-1 mm. wide, 1.10 cm. long; panicle much exserted, spreading, few-flowered, pyramidal in outline, 3-9 cm. long x 2-7 mm. wide near the base; spikelets 1.5-2 mm. long, pale greenish; glumes divergent, acute, slightly keeled at least in the upper part, somewhat scabrous on the keels, greenish towards the centre, more or less hyaline towards the margins, subequal or the lower very slightly longer, shortly exceeding the lemma; lemma membraneous, smooth, glabrous, truncate, rather obscurely 5-nerved, unawned; palea minute; rhachilla not produced; anthers 3, about 0.3-0.4 mm. long; caryopsis narrow elliptical.

Bentham (Fl. Austral. vii., 1878, p. 576) identified this species with *Agrostis scabra* Willd., (i.e., *A. hiemalis* (Walt.) B.S.P.), a North American species which differs in its larger, coarser habit, longer, wider leaves, much larger panicle, and the lemma sometimes awned.

3. *Agrostis Muelleriana* n. nom.

Syn.: *Agrostis gelida* F. Muell., Trans. Vict. Inst. 1855, p. 43, non Trin. (1845). *Agrostis canina* var. β Hook. f., Handb. New Zeal. Fl. (1864) p. 328. *Agrostis canina* var. *gelida* (F. Muell.) Buchanan, Indig. Grasses New Zeal. (1880) pl. XX. *Agrostis Muelleri* Benth., Fl. Austral. vii. (1878) p. 576, non Presl. (1844).

Loc.: New South Wales: Mt. Kosciusko: W. Bauerlen, No. 5, 2.1890; summit, J. H. Maiden and W. Forsyth, 1.1899; tree line to 7,000 feet, J. H. Maiden and W. Forsyth, 1.1899; Pretty Point, R. Helms, No. 63, 2.1901; J. Vickery, 4.2.1930, and 13.1.1940.

Victoria: Cobberas Mountains, 6,000 feet, F. Mueller (Type. K); Summit of Mt. Latrobe, F. Mueller; Buffalo Mountain, J. B. Cleland, 1.1913; Mt. Buffalo, 5,600 feet, on granite, R. H. Cambage, No. 3768, 20.1.1913.

Tasmania: Without exact locality, C. Stuart.

Small, slender, erect, caespitose, glabrous annual, 20-30 cm. high; internodes of the culms often shorter than the sheaths; nodes glabrous; sheaths adpressed to the culms, smooth or sparsely scaberulous; ligule membraneous, 2-3 mm. long, rather acute; blades complicate-setaceous, almost filiform, or sometimes rather flat and acute, scabrous on the margins, 3-10 cm. long; panicle contracted, the lower part usually enclosed in the uppermost sheath or at length exserted, 2-6 cm. long, with short, erect, scabrous branches divided from within 1 cm. from their bases; spikelets about 3-3.5 mm. long, often purplish or straw-coloured, somewhat laterally compressed; glumes rather narrowly divergent, acute, rather narrow, keeled especially in the upper part, scabrous on the keels, unequal, the lower glume the longer; lemma 2.7-3 mm. long, much shorter than the glumes, hyaline, truncate, sometimes minutely toothed. obscurely 5-nerved, the nerves more or less distinct towards the apex, unawned or with a minute delicate awn from near the apex, or with a slender, exserted awn attached about the middle; palea minute, or rarely up to one-third as long as the lemma; rhachilla not produced; callus subglabrous; anthers 3, oblong, 0.6-0.8 mm. long; caryopsis elliptical, slightly shorter than the lemma, about 1.3 mm., shallowly furrowed on one side.

A form of this species with an awned lemma is figured in Agric. Gaz. N.S.W., X (1899) p. 1164, sub *A. Muelleri* Benth. Examination of a number of specimens shows that the presence or absence and length of the awn varies considerably even in the one plant and on the same inflorescence in this species. The type specimen is unawned.

4. *Agrostis australiensis* Mez., in Fedde, Repert. Spec. Nov., xvii. (1921) p. 302. (Figured in Agric. Gaz. N.S.W. X (1899), p. 1166, sub *A. scabra.*)

Loc.: New South Wales: Pretty Point, Mt. Kosciusko, J. H. Maiden and W. Forsyth, 1.1899 (Type Number, K., S.); Snowy Mountains, W. Bauerlen, 3.1890; Kosciusko, J. McLuckie, 1924; Mt. Kosciusko, 5,000-6,000 feet, J. Vickery, 5.2.1930 and 14.1.1940; near Mt. Franklin, in the drier parts of a peat bog, about 5,300 feet, S. T. Blake, No. 13893, 19.1.1939; Kiandra to Yarrangobilly, J. Vickery, 12.1.1940.

Victoria: Mt. Buffalo, J. B. Cleland, 1.1913; 4,500 feet, R. H. Cambage, No. 3770, 20.1.1913; in morasses, ca. 4,500 feet, S. T. Blake, No. 7371, 25.1.1935.

Tasmania: Mt. Wellington, L. Rodway, 1.1893.

Erect, slender, densely caespitose annual (described by Mez as a perennial), 8-20 cm. high; culms 2-noded, the internodes shorter than the sheaths; sheaths striate, scaberulous between the nerves; ligule membraneous, obtuse, about 2 mm. long, scaberulous; blades finely subulate, 1-3 cm. long or sometimes slightly longer, rather rigid, scabrous; panicle lax, capillary, the lower branches remaining suberect and partly enclosed in the uppermost sheaths at first, subpyramidal at maturity; branches 2-3-nate, capillary, sterile and undivided at the base, then again 2-3-nately divided, the ultimate branches bearing few spikelets; branches and pedicels very scabrous; spikelets pedicellate, 2.3-3 mm. long, often purplish-coloured; glumes acute, 1-nerved, keeled, scabrous on the keels, obscurely ciliate on the margins near the apex, sometimes minutely scaberulous on the sides, unequal, the lower glume the longer; lemma membraneous and rather thin but microscaberulous, 5-nerved, about 1.7-2 mm. long, shorter than the glumes, truncate, lanceolate to lanceolate-oblong; palea minute or absent; anthers 3, 0.2-0.4 mm. long, oblong; callus glabrous or with a very few short hairs.

5. *Agrostis venusta* Trin., in Mem. Acad. Petersb. Ser VI., vi. (1841) p. 340. (Figured in Hook. f., Fl. Tas. ii (1860) t. 158 A; and in Agric. Gaz. N.S.W., X (1899) p. 725.)

Syn.: *Lachnagrostis Willdenowii* Nees in Hook. Lond. Journ. Bot., ii. (1843) p. 412, non Trin. (1824). *Agrostis aemula* var. *pumila* F. Muell. ex Hook. f., Fl. Tas. ii. (1860) p. 113.

Loc.: New South Wales: Orange, J. L. Boorman, 11.1906, No. K. 387; Inverell, A. Thomas, 10.1912, No. K. 411; Mt. Kosciusko, R. Helms, 2.1893, No. K. 388; Mt. Kosciusko, 6,000 feet, J. Vickery, 14.1.1940; Yarrangobilly to Kiandra, J. Vickery, 12.1.1940.

Victoria: Mt. Feathertop, A. J. Tadgell, No. K. 389, 12.1917; Pyrenean Mountains, Port Philip, D. E. Cooper, 1856; Lower Lodden, Chas. Walter, 11.1887; Port Fairy, Wm. T. Whan.

Tasmania: Gunn, No. 1008 (Type of *Lachnagrostis Willdenowii* Nees. C.); Base of Mt. Wellington, Gunn, No. 1448, 7.1.1841 in part (mixed with *A. parviflora*); Gunn, No. 592; Epping Forest, Gunn, No. 1008, 30.10.1818; New Norfolk, Gunn, No. 1008; 25.11.1840, 18.11.1840, 4.11.1840 and 10.12.1840; York Town, Gunn, No. 1008, 25.1.1844; Kenmore, Gunn, No. 1008, 19.11.1842; without exact locality, Archer; Hobart, L. Rodway, 1.1895.

West Australia: Blackwood River, Walcott; Perrongerup, F. Mueller.

Erect, caespitose, very slender, glabrous annual, 15-40 cm. high; culms smooth of finely scaberulous, 2-noded, the lower internode usually shorter than the sheath; sheaths scabrous between the nerves, adpressed to the culms; ligule membraneous, obtuse, laciniate, 2-3 mm. long; blades very narrow, almost filiform, crowded at the base, 2-8 cm. long, inrolled, very scabrous; panicle occupying half or more of the culm, more or less spreading, with long verticillate, capillary branches undivided and sterile at their bases for 2-6 cm., then again divided; rhachis smooth below, becoming scabrous above, the branches and pedicels scabrous; spikelets about 2-4 mm. long, laterally compressed, often purplish, on pedicels 1-6 mm. long; glumes rather narrowly gaping, acute, keeled, very scabrous on the keels, minutely ciliate on the margins, rather narrow, unequal, the lower glume the longer; lemma membraneous, glabrous, smooth, 4-nerved, truncate or obscurely 4-toothed at the apex, awned from below the middle; awn rather fine, exserted, about one and a half times as long as the glumes, straight or at length geniculate; palea minute; rhachilla not produced; anthers 3, 0.2-0.3 mm. long, oblong; callus glabrous or with a few very short hairs.

The type specimen has not been seen by the writer, but the specimens examined agree very closely with the description given by Trinius. The discrepancy in the number of anthers, which he gives tentatively as 1, is probably due to his having examined old flowers.

6. *Agrostis Boormanii* n. sp.

Gramen erectum vel paullo geniculatum, gracile, glabrum, caespitosum, annuum, circa 30 cm. altum.; culmi 1-2-nodes, laeves vel scabriusculi sub paniculis et nodis; nodi glabri; vaginae scaberulae, ad culmos appressae vel laxiusculae supra; ligulae membranaceae, obtusae, laciniatae, circa 3 mm. longae; laminae lineares, acuminatae, 5-10 cm. x 1-1.5 mm., inferiores filiformes, haud manifeste sulcatae, scabrae praesertim ad apices; panicula strictiuscula, ambitu lineare-lanceolata, ramis 2-5-natis, capillaribus, erectis vel parum patentibus, flores prope ad bases ferentibus; rhachis laevis subter, scabra supra; rami pedicellique scabri; spiculae circa 2 mm. longae, viridescentes et purpurascentes; glumae inaequales, augustiuscule divergentes, acutae, plus minusve carinatae, carinis scabriusculis, lateribus aliquandum scaberulis, marginibus minutissime et obscure ciliolatis supra; lemma membranaceum, tenue, laeve, glabrum, truncatum, 5-nerve sub media; seta tenuiuscula, breve exserta, ex circa media lemmi; callus subglaber; palea 0; rhachilla haud producta; antherae, 3 late oblongae, circa 0.3 mm. longae; caryopsis ellipticus.

Loc.: New South Wales: Harvey Ranges, Peak Hills, J. L. Boorman, No. K., 11.1905 (Type K., S.).

Slender, erect or somewhat geniculate, glabrous, caespitose annual, about 30 cm. high; culms 1-2-noded, smooth or slightly scabrous below the panicle and node; nodes glabrous; sheaths scaberulous, adpressed to the culms or slightly loose in the upper part; ligule membraneous, obtuse, laciniate, about 3 mm. long; blades linear, acuminate, 5-10 cm. x 1-1.5 mm., the basal ones filiform, shallowly grooved, scabrous especially near the apex; panicle rather contracted, linear-lanceolate in outline, with 2-5-nate, capillary, erect or erectly spreading branches, floriferous nearly to the base; rhachis smooth below, scabrous above, the branches and pedicels scabrous; spikelets about 2 mm. long, greenish and purplish tinted; glumes unequal, rather narrowly divergent, acute, more or less keeled, somewhat scabrous on the keels, sometimes scaberulous on the sides, very minutely and obscurely ciliolate on the margins in the upper part; lemma membraneous, thin, smooth, glabrous, truncate, 5-nerved below the middle, awned from about the middle; awn rather fine, shortly exserted; callus subglabrous; palea absent; rhachilla not produced; anthers 3, broadly oblong, about 0.3 mm. long; caryopsis elliptical.

7. *Agrostis aequata* Nees in Hook. Lond. Journ. Bot. ii (1843) p. 412.

Syn.: *Deyeuxia aequata* (Nees) Benth., Fl. Austral. vii (1878) p. 578. *Calamagrostis aequata* (Nees) J. M. Black, Fl. South Austral., Part 1, (1922) p. 70. (Figured in Hook. f., Fl. Tas. ii (1860) p. 159).

Loc.: Victoria: Nelson, Tate Herbarium, 15.11.1882.

Tasmania: Gunn, No. 1005, 18.1.1838 (Type. C.; type number, K.); Archer.

Geniculate ascending, more or less caespitose annual, 60-70 cm. high; culms about 4-noded, the internodes usually not exceeding the scabrous sheaths; nodes glabrous; sheaths becoming more or less loose from the culm, scaberulous or scabrous especially between the nerves; ligule membraneous, 2-3 mm. long, obtuse or laciniate, scabrous; blades linear, flat, 6-12 cm. x 1.5-2.5 mm., shallowly grooved and more or less scabrous on both surfaces; panicle shortly exserted from the uppermost sheath, rather large, 15-25 cm. long, with numerous, spreading, verticillate, capillary branches, the primary branches again 2-3-nately divided, the rhachis, branches and pedicels all more or less scabrous; internode between the lower whorls 3-6 cm. long, the lower branches undivided at the base for a distance of 2-4 cm.; spikelets pedicellate, about 2 mm. long; glumes equal, ovate, more or less acute, slightly exceeding the lemma, 1-nerved, more or less keeled, very scabrous on the keels, obscurely ciliolate on the margins in the upper part, minutely and distantly scaberulous on the sides, with membraneous margins; lemma 1.4-1.7 mm. long, oblong-lanceolate, broadly truncate or minutely 5-toothed and ciliate at the apex, firmly membraneous, smooth, shining, the 5 nerves apparent at the apex, often obscure below, unawned; palea subequal to the lemma, firmly membraneous; rhachilla not or scarcely produced; anthers 3, 0.5 mm. long; caryopsis oblong; callus barbed with a few short hairs, 0.2-0.5 mm. in length.

8. *Agrostis limitanea* J. M. Black, Trans. & Proc. Roy. Soc. S. Austral. LV (1931) p. 137.

Loc.: South Australia: Near Riverton, Worsley C. Johnston, March 1931 (Co-type. K.).

Erect, caespitose, glabrous, slightly glaucous perennial (? e descr.), 30-45 cm. high; culms slender, rather rigid, about 5-noded, the internodes mostly shorter than the sheaths and very scabrous for some distance below the nodes; nodes glabrous light coloured; sheaths becoming loose in the upper part, densely scaberulous, the upper one clasping the base of the panicle; ligule membraneous, rather acute, about

3 mm. long, slightly scabrous; blades linear, acuminate, fine-pointed, 3-12 cm. x 1.5-2.5 mm., erect, flat at the base, becoming involute-subulate above, grooved and scabrous on both sides especially in the upper leaves; panicle diffuse, at length widely spreading, 8-20 cm. long, with verticillate, capillary branches sterile and undivided at their bases for 2-6 cm., then mostly 3-nately divided; rhachis, branches and pedicels scabrous; pedicels 3-6 mm. long, clavate; spikelets about 3 mm. long, laterally compressed; glumes divergent, acute, 1-nerved, slightly keeled, slightly scabrous on the keels, microscaberulous on the sides, rather narrow with membraneous margins, unequal, the lower glume the longer; lemma about 1.7 mm. long, membraneous, almost hyaline, smooth, somewhat shining, glabrous, truncate and denticulate at the apex, obscurely 4-5-nerved, awnless; palea hyaline, subequal to or slightly shorter than the lemma; callus glabrous; rhachilla produced into a glabrous or sparsely pilose bristle about 0.5 mm. long; anthers oblong, about 0.6 mm. long; caryopsis conical-oblong.

9. *Agrostis rudis* Roem. & Schult., Syst. Veg. ii (1817) p. 360.

Syn.: *Agrostis scabra* R. Br., Prod. (1810) p. 172; Hook. f., Fl. Tas. ii (1860) p. 116, non Willd. (1798). *Vilfa scabra* (R.Br.) Beauv., Agrost. (1812) p. 16. *Deyeuxia scabra* (R.Br.) Kunth, Rév. Gram. i (1829) p. 77; Benth., Fl. Austral. vii (1878) p. 583. *Lachnagrostis rudis* (Roem. & Schult.) Trin., Fund. Agrost. (1820) p. 128; Gram. Unifl. (1824) p. 217 (Note: This combination was based on *Agrostis rudis* Br., a combination which did not exist; it was doubtless a mistake for *A. rudis* Roem. & Schult., which was based on *A. scabra* R.Br.). *Calamagrostis rudis* (Roem. & Schult.) Steud., Syn. Pl. Gram. (1854) p. 192.

Loc.: Tasmania: Adventure Bay, in swamps, Nelson, Feb. 1792; R.Br., Prod. 172, without locality, (Type. B.M.); Trial Harbour, West Coast, L. Rodway, 12.1894.

Geniculate-ascending, loosely tufted, scabrous annual, 60-80 cm. high; culms strongly geniculate at the lower nodes, 3-4-noded, very scabrous, shining, the internodes longer than the sheaths; sheaths striate, becoming somewhat loose, rather scabrous; ligule membraneous, obtuse, 1-3 mm. long; blades flat, linear, acuminate, 10-15 cm. x 3.5-5 mm., striate, shallowly grooved and very scabrous on both sides; panicle large, very spreading, 20-25 cm. long with verticillate branches, the internodes between the lower whorls 6-7 cm. long; branches slender, twice ternately divided, the ultimate branches capillary; pedicels clavate; rhachis, branches and pedicels compressed; glumes slightly keeled especially in the upper part, acute, scabrous on the keels and sides, obscurely ciliolate on the margins especially in the upper part, unequal, the lower glume longer than the upper, about 2.5 mm.; lemma firmly membraneous, glabrous, somewhat shining, lanceolate in outline, shortly 4-toothed, 5-nerved, the nerves obscure except near the apex, with a short, hair-like awn attached below the apex in the type; palea slightly shorter than the lemma, firmly membraneous; rhachilla produced into a bristle about 0.6 mm. long, bearing hairs up to 0.7 mm. in length; callus bearing a few short hairs; anthers oblong, about 0.4 mm. long; caryopsis oblong-elliptical.

Very similar to *A. aequata*, which may possibly prove to be worthy only of varietal rank under *A. rudis*. It differs from *A. rudis* in the smooth sides of the glumes, which are less distinctly acute, equal or subequal both in length and breadth, not exceeding 2 mm. in length. The writer has retained both species until further material and field studies enable a conclusion to be reached.

10. *Agrostis Adamsonii* n. sp.

Gramen erectum vel geniculatum, glabrum, annuum, 45-70 cm. altum; culmi circa 5-nodes, laeves vel minute scaberuli sed retrorse scabrissimi sub paniculis;

internodi quam vaginae breviores; nodi glabri; vaginae tandem laxae supra, striatae, scaberuliusculae inter nervos; ligulae membranaceae, scabrae, 3-5 mm. longae, laciniatae; laminae lineares, acuminatae, 8-25 cm. x 1-3.5 mm., haud manifeste sulcatae, paullo scabrae; panicula magna, patens, base lente ex. vagina summa laxo, 20-25 cm. longa; rami verticillares, graciles, nudi et indivisi 4-7 cm. ad bases tum bis vel ter 3-nate divisi, spiculas paucas ad apices ramorum ultimorum capillorum ferentes; pedicelli 2-8 mm. longi, subclavati; rhachis, rami pedicelli scabri; spiculae circa 3-3.5 mm. longae, viridescens, ambitu lanceolato-ellipticae, tandem paullo laterale compressae; glumae acutae vel acuminatae, 1-nerves, breve lemma excedentes, subaequales, tandem paullo divergentes, inferior carinata, superior tantum supra carinata, carinis scabris; lemma firme membranaceum, glabrum, laeve, brevissime 4-dentatum, obscure 5-nerve, seta sub apice; palea prope lemma aequalans, membranacea, tenuis, minute 2-fida, latiuscula; callus pilos breves ferens; rhachilla in seta brevi pilosa 0.2-0.5 mm. longa producta; lodiculi membranacei, lineares, circa 0.7 mm. longi; antherae 3, 0.4-0.6 mm. longae; caryopsis ellipticus, paullo compressus, parum subtilis sulcatus.

Loc.: Victoria: Melbourne, Adamson, 12.11.1853, No. 226 (Type. K.).

Erect or geniculate, glabrous annual, 45-70 cm. high; culms about 5-noded, the internodes shorter than the sheaths, smooth or minutely scaberulous but very retrorsely scabrous just below the panicle; nodes glabrous; sheaths becoming loose from the culm above, striate, somewhat scaberulous between the nerves; ligule membraneous, scabrous, 3-5 mm. long, laciniate; blades linear, acuminate, 8-25 cm. x 1-3.5 mm., shallowly grooved, slightly scabrous; panicle large, spreading, the base of the panicle often remaining enclosed by the uppermost sheath until late in development, 20-25 cm. long, with verticillate, slender branches sterile and undivided at their bases for 4-7 cm., then 2-3 times 3-nately divided, with few spikelets born towards the ends of the ultimate capillary branches; pedicels 2-8 mm. long, subclavate; rhachis, branches and pedicels scabrous; spikelets about 3-3.5 mm. long, greenish, lanceolate to elliptical in outline, at length slightly laterally compressed; glumes acute to acuminate, 1-nerved, subequal, the lower keeled throughout, the upper keeled only in the upper part, scabrous on the keels, at length slightly divergent, shortly exceeding the lemma; lemma firmly membraneous, glabrous, smooth, very shortly 4-toothed at the apex, obscurely 5-nerved, awned from below the apex; palea nearly as long as the lemma, membraneous, thin, minutely 2-fid, rather broad; callus bearing short hairs; rhachilla produced into a short, hairy bristle 0.2-0.5 mm. long; lodicules membraneous, linear, about 0.7 mm. long; anthers 3, 0.4-0.6 mm. long; caryopsis elliptical, somewhat flattened, shallowly furrowed.

11. *Agrostis Billardieri* R.Br., Prod. (1810) p. 171.

Syn.: *Avena filiformis* Labillardiere, Nov. Holl. Pl. Spec. i (1804) p. 24, t. 31, excl. syn. Forst., non Forst. (1786). *Vilfa Billardieri* (R.Br.) Beauv., Agrost. (1812) p. 16. *Agrostis Labillardieri* Roem. & Schult., Syst. Veg. ii (1817) p. 360. *Lachnagrostis Billardieri* (R.Br.) Trin. Fund. Agrost. (1820) p. 128; Gram. Unifl. et Sesquifl. (1824) pp. 217, 294. *Deyeuxia Billardieri* (R.Br.) Kunth, Rév. Gram. i (1829) p. 77. *Calamagrostis Billardieri* (R.Br.) Steud., Nom. Bot., ed. II. i (1840) p. 249. *Agrostis diffusa* Banks & Soland. ex Hook. f., Fl. Nov.-Zel. i (1853) p. 298, non Bess (1809) vel Host (1809). *Agrostis Solandri* F. Muell., Veg. Chatham Is., (1864) p. 60 pro parte. *Calamagrostis aemula* var. *Billardieri* (R.Br.) Maiden & Betche, Census of N.S.W. Pl., (1916) p. 21.

Loc.: New South Wales: Clarence River, Wilcox; Angowrie, J. Vickery, 24.1.1936; Port Macquarie, J. L. Boorman, 11.1915; Port Jackson, R. Brown, No. 6218

(Type. B.M. See note below); Gladesville, Woolls, (Deane Herbarium) No. 51, 10.1894; Manly, E. Betche, 11.1885; Neutral Bay, J. B. Cleland, 1.1912; Jervis Bay, G. Caley, 1801.

Victoria: without exact locality, W. H. Harvey, Sept.-Dec. 1854; Port Fairy, Wm. T. Whan.

Tasmania: Gunn, No. 1007; on Ocean Beach, Gunn, 8.1.1838; Hummock Sound, Bass Straits, Milne, Voyage of H.M.S. Herald; Lawrence, No. 7; Kings Island, Neate; Recherche Bay, J. H. Miaden, 3.1908; Blackman's Bay, L. Rodway, 12.1928.

South Australia: Port Elliot, J. B. Cleland, 11.1921, No. H.236; Cape du Couëdic, near sea, J. B. Cleland, 17.11.1924, No. H.234; Beachport, Tate Herbarium, 13.11.1882.

Note: The type sheet, No. 6218 at the British Museum of Natural History, bearing a label in Robert Brown's hand "*Agrostis Billardieri* Prod. 171, Port Jackson" has 3 plants mounted on it. That on the right-hand side is an excellent specimen about 35 cm. high, and agrees closely with Brown's description, notably in regard to the glabrous lemma. The central plant is smaller, about 20 cm. high, but has a similar glabrous lemma, and doubtless belongs to the same species. The plant mounted on the left-hand side of the sheet superficially closely resembles the first, but differs in having a very villous lemma, so that it definitely cannot represent the type of the species. It agrees with specimens labelled *Agrostis aemula* by Brown. The first two plants must therefore be accepted as the type of *A. Billardieri* R.Br.

Erect or obliquely ascending, glabrous, caespitose annual, 15-45 cm. high, usually growing on sandy soils along sea coasts; culms 3-noded, the internodes shorter than the sheaths, smooth except scabrous below the nodes and very scabrous below the panicle; nodes glabrous; sheaths rather loose especially in the upper part, finely but densely scabrous, striate; ligule membraneous, 4-8 mm. long, obtuse, laciniate, scabrous; blades flat, linear, shortly acuminate, distinctly striate, shallowly grooved on both surfaces, the nerves projecting on the upper surface, very scabrous on the nerves, especially on the upper surface, 5-40 (usually about 20) cm. x 2-8 (usually 4-6) mm.; panicle at first enclosed at the base in the uppermost sheath, at length shortly exserted and stiffly divaricately spreading; lower branches subverticillate, the internodes between the whorls 3.5 cm. long, rather stiff, sterile and undivided at the base for 2-5 cm., then 2-3 times 2-3-nately divided, the ultimate branches and 2-10 mm. long pedicels more or less capillary; main axis, branches and pedicels densely scabrous; spikelets 4.5-7.5 (usually about 6) mm. long, greenish, purplish or straw-coloured, laterally compressed; glumes divergent, rather long acuminate, narrow, 1-nerved, keeled especially in the upper part, scabrous on the keels, sometimes slightly and distantly scabrous on the sides, minutely ciliate on the margins in the upper part, slightly unequal, the lower glume the longer; lemma about 3-4.5 mm. long, lanceolate in outline, firmly membraneous, somewhat shining, glabrous, smooth or very faintly scaberulous especially on the nerves in the upper part, 4-nerved above the middle, the nerves very obscure below, 4-toothed at the apex, the lateral teeth prolonged up to 1 mm. in length, awned from about the middle; awn rather firm and twisted in the lower part, much exserted, geniculate; palea membraneous, thin, about two-thirds as long as the lemma, 2-fid, lanceolate; callus barbed with numerous hairs 0.2-0.8 mm. in length; rhachilla produced into a bristle 0.8-2.5 mm. long, bearing hairs up to 1.5 mm. in length, very rarely bearing a second lemma; anthers 3, about 0.8-1 mm. long; ovary narrow-oblong; caryopsis narrow, oblong-elliptical.

11a. *Agrostis Billardieri* var. *filifolia* n. var.

Ab typo habito graciliori altiori, laminis angustioribus (1-1.5 mm. latis) prope filiformis, paniculis paucifloris, capillarioribus, lateribus glumarum laevibus, carinis scabris, antheris 1.5 mm. longis differt. Haud littoras habitat.

Loc.: Victoria: Hawkesdale, H. B. Williamson, No. K. 410, 12.1901 (Type K., S.).

Tasmania: Bradyman's Range, L. Rodway, 2.1929; Hobart, L. Rodway, 1929.

Differs from the type in the more slender and rather taller habit, the very narrow (1-1.5 mm. wide), almost filiform leaves, rather fewer flowered and more capillary panicle, the glumes smooth on the sides, scabrous only on the keels, anthers 1.5 mm. long. Not littoral in habitat.

11b. *Agrostis Billardieri* var. *robusta* n. var.

Ab typo habito erecto, rigidiusculo, circa 60 cm. alto, laminis angustis, involutis in sicco, saepe 25 cm. longis, acuminatis, lemma plus manifeste scaberulo supra, glumis angustis, carinis glumarum scabrissimis differt. Non littoras habitat.

Loc.: Victoria: Melbourne, Adamson, 27.11.1853, No. 224 (Type. K.).

Tasmania: Hobart, A. H. S. Lucas, 12.1923.

Differs from the type in the tall, erect, rather rigid habit, about 60 cm. high, not littoral in habitat; leaves narrow, inrolled on drying, long, often 25 cm., acuminate; lemma more conspicuously scaberulous in the upper part; glumes very scabrous on the keels, rather narrow.

12. *Agrostis plebeia* R.Br., Prod. (1810) p. 172.

Syn.: *Vilfa plebeia* (R.Br.) Beauv., Agrost. (1812) p. 16. *Lachnagrostis plebeia* (R.Br.) Trin., Fund. Agrost. (1820) p. 128; Gram. Unifl. (1824) pp. 217 and 294. *Deyeuxia plebeia* (R.Br.) Benth., Fl. Austral. vii (1878) p. 580. *Calamagrostis plebeia* (R.Br.) O. Kuntze, Rév. Gen. Pl. III. ii (1898) p. 343. *Calamagrostis aemula* var. *plebeia* Maiden & Betche, Census N.S.W. Pl., (1916) p. 21. *Didymochaeta australis* Steud., Syn. Pl. Gram., (1854) p. 185. *Deyeuxia australis* (Steud.) Benth. & Hook. f., Gen. Pl. III (1883) p. 1153.

Loc.: New South Wales: Port Jackson, R. Brown, No. 6220 (Type. B.M.).

West Australia: South-west Australia, Drummond, No. 370, 1848 (Type number of *Didymochaeta australis* Steud. K.); Swan River, Drummond, No. 223; Mullewa, C. B. Palmer, No. 31, 1930; Bayswater, A. Morris, 8.12.1898; Peel Estate, G. K. Baron Hay, 11.1924; without exact locality, A. G. Hamilton, 1902; between Kunnunoppin and Mt. Marshall and Lake Barlee, Fitzgerald Fraser, Winter-Spring, 1919.

Note: The type specimen of this species was stated by Robert Brown to have been collected at Port Jackson. This appears, however, to be the only record of its occurrence in eastern Australia, although it is known from many localities in Western Australia. This suggests the possibility that the locality of the type collection may have been erroneously written up, and that the species may be restricted to Western Australia.

Erect, very slender, glabrous, caespitose annual, 20-30 cm. high; culms more or less smooth, about 3-noded, the internodes either slightly shorter than or slightly longer than the sheaths; upper sheaths adpressed to the culms, the lower ones becoming loose, smooth; ligule membraneous, obtuse, 2-3 mm. long; blades flat or loosely convolute, very narrow, almost filiform, 2-7 cm. x 0.5-1 mm., linear, acuminate; panicle shortly exserted or the base enclosed in the uppermost sheath, very loosely contracted, 4-12 cm. long, with erect, capillary, unequal, 1-3-nate branches, the longer ones again 3-nately divided; rhachis smooth, the branches and pedicels rather distantly scabrous; spikelets about 3-4 mm. long, laterally compressed, on filiform pedicels 2-5 mm. long; glumes divergent, acute, keeled, scabrous on the keels, slightly scaberulous on the sides, unequal, the lower glume the longer; lemma membraneous, villous, 4-toothed at the apex, the dorsal teeth short, the lateral teeth long up to 1.5 mm., about 1.5-2 mm. long excluding the teeth, awned from near the base; dorsal awn much exserted, about twice as long as the glumes, geniculate, twisted below the bend, very fine above; palea thin, membraneous, shorter than the lemma; anthers 2, oblong, about 0.3 mm. long; rhachilla not produced or sometimes produced into a very short, hairy bristle up to 0.2 mm. in length; caryopsis narrow elliptical.

13. *Agrostis Drummondiana* (Steud.) n. comb.

Syn.: *Dichelachne Drummondiana* Steud., Syn. Pl. Gram., (1854) p. 120. *Deyeuxia Drummondiana* (Steud.) Benth., Fl. Austral. vii (1878) p. 580.

Loc.: West Australia: South-west Australia, Drummond, No. 371 (Type number. K.); Bassendean, C. B. Palmer, No. 30, 1930; Vasse River, Mrs. Molloy, 1939.

Erect, caespitose, glabrous annual, 40-60 cm. high; culms more or less smooth except very scabrous below the panicle, the internodes usually shorter than the sheaths, 4-noded; nodes glabrous; sheaths becoming rather loose in the upper part, more or less scaberulous between the nerves; ligule membraneous, usually obtuse, sometimes rather acute, 3-7 mm. long, sometimes slightly scabrous or distinctly veined; blades flat at the base, becoming convolute in the upper part when dry, narrow linear, acuminate, 3-15 cm. x 1-3 mm., shallowly grooved and slightly scabrous on both sides when dry; panicle loosely contracted, the lower part enclosed by the uppermost sheath, lanceolate or linear-lanceolate in outline, 15-25 cm. x 2-3 cm., or at length shortly exserted and somewhat spreading, with verticillate, erectly spreading, unequal, capillary branches again divided and floriferous from 2.5-5 cm. above their bases; rhachis, branches and pedicels scabrous; spikelets yellowish-green, about 5-6 mm. long, pedicellate, laterally compressed; glumes narrowly divergent, about twice as long as the lemma, rather narrow, very acuminate, unequal, the lower the longer, keeled especially in the upper part, scabrous on the keels, the margins membraneous; lemma about 3 mm. long, membraneous, covered with villous hairs, 4-toothed at the apex, the lateral teeth about 0.5 mm. long, the dorsal teeth short, awned from about the middle, lanceolate in outline, 4-nerved above the middle; awn much exserted, 7-10 mm. long, geniculate, rather strong and twisted in the lower part, filiform above; palea membraneous, thin, smooth, shorter than the lemma, 2-2.3 mm. long, minutely 2-toothed at the apex; rhachilla produced into a bristle about 0.5 mm. long, bearing hairs up to 1.3 mm. in length; anthers 3, oblong, about 0.5 mm. long; caryopsis narrow oblong-elliptical.

14. *Agrostis Preissii* (Nees) n. comb.

Syn.: *Lachnagrostis Preissii* Nees in Lehm., Pl. Preiss. ii (1846-7) p. 97. *Deyeuxia Preissii* Nees ex Index Kew (1893) p. 470. *Deyeuxia Forsteri* var. *Preissii* (Nees) Benth., Fl. Austral. vii (1878) p. 579. *Agrostis Solandri* F.Muell., Veg. Chatham Is., (1864) p. 60 pro parte.

Loc.: West Australia: In regionibus interioribus Australiae meridionale-occidentalis, Preiss, No. 1846, Oct. 1840 (Type number. K., B.M.); Swan River, Drummond; Kunnunoppin, F. Stoward, No. 702, 1916; Bullabilly, W. A. Goldfields, Spencer Moore, 1895.

Glabrous, caespitose annual, 12-45 cm. high, erect or slightly geniculate at the lower nodes; culms slender, about 4-noded, smooth or slightly scaberulous throughout, the internodes either longer or shorter than the sheaths; sheaths becoming loose from the culms in the upper part, smooth or faintly scaberulous between the nerves; ligule membraneous, thin, 3-6 mm. long, rather acute; blades very fine, complicate-setaceous, long attenuate, 2-12 cm. long, smooth or the upper ones rather scabrous; panicle loosely contracted, linear to narrow lanceolate, 4-15 cm. long, with capillary, more or less erect branches; rhachis, branches and pedicels scabrous; spikelets about 4-4.5 mm. long, laterally compressed, mostly greenish or straw-coloured; glumes divergent, acuminate, 1-nerved, keeled especially in the upper part, somewhat scabrous on the keels, sometimes more or less microscaberulous on the sides, with membraneous margins, unequal, the lower glume the longer; lemma membraneous, villous, truncate and minutely 4-toothed at the apex, 5-nerved, the nerves apparent above, obscure below, awned from about or above the middle; awn much exserted, nearly twice as long as the glumes, geniculate; palea shorter than the lemma, very thin, membraneous, minutely 2-fid; callus barbed with numerous hairs; rhachilla produced into a short, hairy bristle; anthers 3, about 0.3 mm. long, oblong; caryopsis elliptical.

15. *Agrostis avenacea* Gmel., Syst. Nat. Part I (1791), p. 171.

Syn.: *Calamagrostis avenacea* (Gmel.) Becherer, Candollea, VII (1938) p. 519. *Avena filiformis* G. Forster, Flor. Insul. Austral. Prod., (1786) p. 9. *Agrostis filiformis* (Forst.) Spreng., Fl. Hal. Mant. 32 (1807), non Vill. (1787). *Lachnagrostis filiformis* (Forst.) Trin., Fund. Agrost. (1820) p. 128. *Calamagrostis fiiliformis* (Forst.) Cockayne, Rep. Bot. Surv. Tongariro Nat. Park, (1908) p. 35; Pilger in Dansk Vidensk. Selsk. Biol. Medd. iii. II (1921) p. 9, non Griseb. (1868). *Deyeuxia filiformis* (Forst.) Petrie in Chilton, Subantarctic Is. of New Zeal., ii (1909) p. 474, non Hook. f. (1897). *Agrostis retrofracta* Willd., Enum. Pl. Hort. Berol., (1809) p. 94. *Vilfa retrofracta* (Willd.) Beauv., Agrost. (1812) p. 16. *Lachnagrostis retrofracta* (Willd.) Trin., Fund. Agrost. (1820) p. 128. *Deyeuxia retrofracta* (Willd.) Kunth, Rév. Gram. i (1829) p. 77. *Calamagrostis retrofracta* (Willd.) Link ex Steud., Nom. Bot., ed. II (1840) i. p. 251. *Agrostis debilis* Poir., Encycl. Meth. Bot. Suppl. I (1810) p. 249. *Vilfa debilis* (Poir.) Beauv., Agrost. (1812) p. 16. *Agrostis Forsteri* Rich ex Roem. & Schult., Syst. Veg. ii (1817) p. 359. *Lachnagrostis Forsteri* (Rich ex Roem. & Schult.) Trin., Gram. Unifl., (1824) p. 217. *Deyeuxia Forsteri* (Rich ex Roem. & Schult.) Kunth, Rév. Gram. i (1829) p. 77. *Calamagrostis Forsteri* (Rich ex Roem. & Schult.) Steud., Nom. Bot., ed. II i (1840) p. 250. *Lachnagrostis Willdenowii* Trin., Gram. Unifl., (1824) p. 217. *Calamagrostis Willdenowii* (Trin.) Steud., Syn. Pl. Gram., (1854) p. 192. *Agrostis ligulata* Steud., Syn. Pl. Gram., (1854) p. 173. *Agrostis Solandri F. Muell.,* Veg. Chath. Is., (1864) p. 60, pro parte.

I have not seen the type specimen of *Agrostis debilis* Poir. Bentham stated that this species was described from material raised from Australian seeds, and Steudel included it under *Calamagrostis retrofracta,* but Poiret himself stated that the country of origin was unknown to him.

Agrostis ligulata Steud. appears to be merely a slender, narrow-leafed form of *A. avenacea* Gmel., often with a rather smaller panicle, which commonly occurs in dry situations. Field observations show that, like many other annuals, the size of the plant of *A. avenacea* can be much affected by habitat or by the prevailing climatic conditions, and so many growth forms occur that there seems no purpose in retaining the name *A. ligulata* for this one.

Agrostis avenacea Gmel. (*Avena filiformis* Forst.) was described from New Zealand, *Agrostis retrofracta* Willd. from a cultivated specimen of which seeds had been obtained from Tasmania. A specimen of *Avena filiformis* from Forster's herbarium is preserved at Kew, and I have compared this with Australian material, especially with a specimen from the herbarium of J. Gay, labelled "Cult. ex Nova Hollandia, Swartz, Oct. 1818," which is probably part of the same material as that described as *Agrostis retrofracta* by Willdenow. There seems no doubt that the Australian material belongs to *Agrostis avenacea.*

Deyeuxia Forsteri var *aristata* Benth., Fl. Austral. vii (1878) p. 579, was described as "Outer glumes produced into long point." The acute or long acuminate condition of the glumes varies considerably in *Agrostis avenacea,* however, and the specimens cited by Bentham under the variety have glumes scarcely more acuminate than others cited by him under the species.

Deyeuxia Forsteri var. *laeviglumis* Benth., l.c., was described as "Flowering glume nearly glabrous except marginal cilia." In the specimens cited by Bentham, the lemma is distinctly hairy on the back in many spikelets, though the hairs have been more or less rubbed off in some of the spikelets. There do not appear to be any other differences which would justify retaining these two varieties as distinct.

Loc.: Cult. ex Nova Hollandia, Swartz, Oct. 1818 ex Herb. J. Gay. (Possibly part of the type collection. K.).

Queensland: Between Lawnton and Strathpine, on wet laterite soil, S. T. Blake, No. 53, 4.10.1930; Brisbane River, A. Cunningham, June, 1829; Wyandra, C. Sutton, 11.1930; Cooper's Plains near Brisbane, C. T. White, 9.10.1909; on rocks at head of Little Nerang River, C. T. White, 1.1.1916; Moreton District, Beechmont, J. Henderson, 17.11.1930; Darling Downs, between Inglewood and Milmerran, common in damp places round edges of Billabongs, along creek banks, etc., C. T. White, No. 9756, 20.1.1934; Messines, near Stanthorpe, M. Greener, 12.1930; Bulimba, near Brisbane, C. E. Hubbard, No. 4063, 14.9.1930; Springbrook, Macpherson Range, C. E. Hubbard, No. 4219, 28.9.1930; near Kuraby, south of Brisbane, C. E. Hubbard, No. 4099, 20.9.1930; Charleville, C. E. Hubbard and C. W. Winders, No. 6144, 3.1.1931; Macalister, C. E. Hubbard and C. W. Winders, No. 6450, 7.1.1931; Chudleigh Park Station, 110 miles north of Hughenden, black soil amongst *Scirpus* spp., C. E. Hubbard and C. W. Winders, No. 7620, 14.11.1931; near Stanthorpe, C. E. Hubbard, No. 5733, 11.3.1931; near Gurulmundi, Darling Downs, C. E. Hubbard, No. 5135, 16.11.1930; between Laidley and Forest Hill, Moreton District, C. E. Hubbard, No. 5288, 28.11.1930.

New South Wales: Without exact locality, Whittet, No. 5, 1931; Sydney, Stephensons; Sydney, E. Cheel, 10.1900, Kneucker, Gram. Exsicc. No. 218; Port Jackson and Port Dalrymple, R. Brown, No. 6219 in part; Sieber, Agrostotheca No. 81; New England, C. Stuart; 14 miles north-east of Guyra, granite soil, E. N. McKie, No. 662, 18.12.1930; Western interior, Cunningham, 1817; Barraba, H. M. R. Rupp, No. 4, 24.11.1913; Nyngan, W. F. Blakely, No. 47, 10.1912; near Katoomba in railway cutting, S. T. Blake, No. 13927, 23.1.1939; Kangaroo Valley, 12 miles west of Nowra, F. A. Rodway, No. 157, 30.10.1930; Bargo, R. H. Cambage, 3.11.1923; Homebush, J. Vickery, 21.9.1930, No. 40; Governor's Paddock, Sydney, J. H. Camfield, 2.12.1902; Glen Innes, E. Breakwell; Inverell, E. O. Thomas, No. 2, 11.1912; Coonamble, in bore drain, E. Breakwell, 7.1912; Lake George, Cunningham, No. 67: Wyalong, J. L. Boorman. 10.1903: Morisset. J. L. Boorman. 10.1899;

Temora, J. W. Dwyer, 12.1916; Lake Cudgellico, J. L. Boorman, 5.1906; Nouvelle Hollande, Côte orientale, M. Verreaux, 1845, No. 239, ex Herb. Mus. Paris.

Victoria: Wando Vale, Robertson, No. 43, 11.1819; Yackandanda, A. Meebold, No. 21594, 11.1936; Toorabin, near swamp, J. Vickery; 20.1.1935; Lodden, Chas. Walter, 11.1887.

Tasmania: Base of Mt. Wellington, Gunn, No. 1447, 1.3.1839; New Norfolk, Gunn, No. 1447, 11.1840; Hobart, G. Caley, 12.1805; Cambridge, roadside, D. Martin, 1.1934.

South Australia: Near Blanchetown, on river flat, J. B. Cleland, No. H. 240, 11.1913; Koonamore Vegetation Reserve, T. B. Paltridge, No. 15, 3.3.1930; Centre of South Australia, Schomburgk, No. 155, 1874; Mt. Lofty Ranges, O. E. Menzel, 11.1896; Port Adelaide, Blondowski, (Type of *A. ligulata* Steud.); Torrens River, F. Mueller, ex Herb. W. Sonder; Encounter Bay, J. B. Cleland, 1.1925.

West Australia: Between Fraser's Range and Esperance Bay, Dempster; Murchison, R. Oldfield; Between Kunnunoppin and Mt. Marshall, Fitzgerald Fraser, 1919; Swamp near Subiaca, W. V. Fitzgerald, 11.1901.

Very variable, erect or somewhat geniculate, glabrous annual, 15 cm. (in dry situations) to 70 cm. high; culms about 4-noded, the internodes either longer or shorter than the sheaths, terete, somewhat compressible, very slender to moderately stout, more or less scaberulous, very scabrous below the panicle; nodes glabrous; sheaths more or less densely scaberulous, often becoming rather loose from the culm in the upper part; ligule membraneous, obtuse, scabrous, 3-8 mm. long; blades linear, acute or acuminate, very variable in size, 8-25 cm. x 1-3.5 (usually 2) mm., shallowly grooved and slightly to densely scabrous on the nerves on both surfaces; panicle large and divaricately spreading at maturity in well developed specimens, when young the lower part enclosed by the uppermost sheath the upper part spreading or somewhat drooping, sometimes much reduced if growing under unfavourable conditions; branches very slender, subverticillate, the lower ones sterile and undivided at their bases for 3-8 cm., then again 1-3 times 2-3-nately divided, the ultimate branches capillary; rhachis, branches and 1.5 mm. pedicels scabrous; pedicels 1-5 mm. long, clavate; spikelets rather numerous towards the ends of the branches, greenish or straw-coloured, sometimes tinged with purple, 2-4 mm. long, rarely longer, laterally compressed; glumes rather narrowly divergent, acute or acuminate, 1-nerved, keeled, scabrous on the keels, usually smooth on the sides, rather narrow; lemma 1.3-2 mm. long, membraneous, villous, 4-nerved and the nerves apparent above the middle obscure below, truncate and very shortly and equally 4-toothed at the apex, awned from about the middle; awn exserted, usually fine, geniculate; palea slightly shorter than or subequal to the lemma, very thin, membraneous, minutely 2-fid; callus barbed with short hairs; rhachilla produced into a short, hairy bristle; anthers 3, oblong, usually 0.2-0.4 mm. long, rarely rather longer; caryopsis oblong-elliptical.

15A. *Agrostis avenacea* var. *perennis* n. var.

Ab typo rhizoma perenni, antheris circa 0.7 mm. longis, culmis rigidioribus, circa 70 cm. altis differt.

Loc.: Victoria: Yarra, F. Mueller, 1853; Wando Vale, Robertson, No. 44.

South Australia: Encounter Bay, J. B. Cleland, No. H.242, 1.1925 (Type K.); Wilpena Creek, J. B. Cleland, No. H.238, 10.11.1928.

Differs from the type in the perennial rootstock, anthers about 0.7 mm. long, culms rather more rigid, about 70 cm. high.

16. *Agrostis aemula* R.Br., Prod. (1810) p. 172. (Figured in Ag. Gaz. N.S.W., II (1892) p. 309, and in Turner, Austral. Grasses (1895) p. 20, sub *Deyeuxia Billardieri*).

In his description of *Agrostis aemula*, Robert Brown cited "J. D.", i.e., Port Jackson and Tasmania, as localities. A sheet of Robert Brown's No. 6219 at the British Museum of Natural History bears two labels, both written by Brown as "*A. aemula*, Port Jackson and Port Dalrymple." This must be regarded as the type sheet. However it bears two distinct plants, that mounted on the left hand side with rather broad leaves up to 5 mm. wide, with spikelets purplish-green in colour, wide spreading panicle, the lemma shortly and equally 4-toothed; that on the right hand side is a more slender plant with very narrow leaves about 1.5 mm. wide, spikelets pale green in colour, and panicle narrower. It is therefore necessary to select one of these as the lectotype. The specific description given by Brown does not contain any points which would assist in making a decision between the two plants. Another sheet at the British Museum is written up by Brown as "*Ag. aemula*, Port Dalrymple, coll. Paterson", and this bears a plant with broad leaves, large spreading panicle and purplish spikelets very like the broad-leafed form on the type sheet (differing slightly in the rather larger spikelets and lemmas with 2 longer teeth). This would tend to suggest that the broad-leafed form on the type sheet represents Brown's view of *A. aemula*. Still another sheet (also No. 6219) which seems to agree with the narrow-leafed form on the type sheet has been written up by Brown as "*Agrostis* cfr. *A. aemulam et Avenam filiformem*, non Billard.," indicating that Brown did not place this form definitely with his *A. aemula*. It seems therefore that the broad-leafed form on the type sheet must be selected as the type of *A. aemula* R.Br., and that the narrow-leafed form was mounted on the sheet in error, or at any rate does not represent Brown's idea of *A. aemula*.

Syn.: *Vilfa aemula* (R.Br.) Beauv., Agrost. (1812) p. 16. *Lachnagrostis aemula* (R.Br.) Trin., Fund. Agrost. (1820) p. 128; Nees ex Hook. f., Handb. New Zeal. Fl. (1864) p. 329. *Deyeuxia aemula* (R.Br.) Kunth, Rév. Gram. i. (1829) p. 77. *Calamagrostis aemula* (R.Br.) Steud., Nom. Bot., ed. II, i. (1840) p. 249; Steud., Syn. Pl. Gram. (1854) p. 192. *Agrostis Solandri* F. Muell., Veg. Chath. Is. (1864) p. 60 in part. *Agrostis semibarbata* Trin., Mem. Acad. Petersb. VI. vi. (1845) p. 378 (from the description this appears to represent a form with large spikelets, lemma with 2 long teeth, and anthers large and linear).

Loc.: New South Wales: New England, open forest, C. Moore, 5.1867; Guy Fawkes, J. H. Maiden, 12.1893; Acacia Creek, J. Clarke, 11.1912; Guyra, 3-4,000 feet, J. Vickery, No. 75, 30.12.1934; Armidale, Perrot; North of Bathurst, Cunningham, 1822; Salisbury, J. Vickery, 18.10.1929; Parramatta, J. Vickery, No. 65, 6.10.1930; Port Jackson and Port Dalrymple, R. Brown, No. 6219 in part (selected as the Type. B.M.); Huskisson, Jervis Bay, at sea level, F. A. Rodway, No. 142, 18.10.1930.

Victoria: Gippsland, F. M. Campbell; Pyrenean Mountains, Port Phillip, D. E. Cooper, 1856; Botanic Gardens, Domain, South Yarra, F. Pitcher, 1913.

Tasmania: Port Dalrymple, Paterson; Side of Western Mountains, altitude 2,000 feet, Gunn, No. 592, 16.1.1845; Penquite, Gunn. No. 592, 9.12.1844; Gunn, No. 1006, 11.12.1837; Macquarie Plains, Gunn, No. 592, 19.11.1942; Gunn, No. 1008 and No. 202; New Norfolk, Gunn, No. 1446, 11.12.1840; Hobart, A. H. S. Lucas, 12.1923; Cascades, D. Martin, 12.1933; Hobart, L. Rodway, 1.1930.

South Australia: Basket Range, J. F. Bailey, 29.11.1930; Mt. Lofty, Belair, E. H. Ising, No. 2324, 1.11.1924; Kinchina, J. B. Cleland, No. H. 239, 8.11.1924; Waterfall Gully, near Adelaide, J. B. Cleland, No. H. 235, 11.1920; Belair, M. Koch, No. 933, 10.1902; Hundred of Knitpo, W. Gill, 11.1905.

Western Australia: Swan River, Drummond; Banks of Blackwood, Oldfield; Gordon River, Oldfield.

Erect, glabrous, caespitose annual, 25-60 cm. high, leafy at the base; culms 2-4-noded, the internodes mostly shorter than the sheaths, mostly smooth or slightly scaberulous, but very scabrous below the panicle; nodes glabrous; sheaths more or less densely scaberulous, striate; ligule membraneous, rather obtuse, laciniate, scabrous; blades linear, acute or shortly acuminate, 8-20 cm. x 2-7 (mostly 3-4) mm., shallowly grooved and slightly scabrous on the nerves on the upper surface; panicle large, divaricately spreading and shortly exserted at maturity, the lower parts remaining enclosed in the uppermost sheaths and erectly spreading above when young, with many verticillate, slender, unequal branches bare and undivided at their bases for 3-8 cm., then again 2-3 times 2-3-nately divided into capillary branches, the spikelets born on capillary, 2-8 mm., subclavate pedicels; rhachis, branches and pedicels scabrous; spikelets usually greenish when young, becoming strongly tinged with purple, 3.5-6 (usually about 5) mm. long, laterally compressed; glumes divergent, acuminate, unequal, the lower glume the longer, 1-nerved, keeled, scabrous on the keels, the margins somewhat membraneous; lemma 1.8-3 mm. long, membraneous, villous, truncate and 4-toothed at the apex, the 2 dorsal teeth short, the 2 lateral teeth slightly or quite considerably elongated and up to about 0.8 mm. long, awned from about the middle; awn much exserted, geniculate; callus barbed with numerous 0.2-0.6 mm. hairs; rhachilla produced into a hairy bristle about 0.5 mm. long, sometimes longer, rarely bearing a second lemma or awn; palea shorter than the lemma, thin, membraneous, shortly 2-fid; anthers 3, broad linear, 0.6-1.2 mm. long; caryopsis elliptical, rather dorsally compressed.

The length of the teeth at the apex of the lemma, and the length of the anthers, lemmas and spikelets show a considerable degree of variation amongst different specimens, but so many intergrading forms occur that it does not seem possible to recognise different varieties on these characters.

16A. *Agrostis aemula* var. *setifolia* (Hook. f.) n. comb.

Syn.: *Agrostis Billardieri* var. *setifolia* Hook. f., Fl. Tas. ii. (1860) p. 115.

Loc.: Tasmania: New Norfolk, Gunn, No. 1446, 15.11.1840 (Type. K.); Penquite, Gunn, No. 592, 9.12.1844; Archer's Herb. of Tas. Plants, No. 5 A.

This variety differs from the type in the very narrow, setaceous or subfiliform leaves about 1 mm. wide and flat or inrolled; culms usually scabrous; panicle rather more lax; spikelets mostly 5-7 mm. long; glumes long acuminate; lemmas about 3-3.5 mm. long excluding the 0.5-1 mm. teeth, microscaberulous on the nerves; awn inserted much below the middle; palea deeply 2-fid; anthers usually 1-1.2 mm. long.

This is possibly a distinct species, but apart from the very narrow leaves it is closely allied to some forms of *A. aemula.* It shows a very close superficial resemblance to *A. Billardieri* var. *filifolia*, but differs in the very pubescent lemma.

Key to the Indigenous Species of *Agrostis* Linn. in Australia.

1. Palea absent or minute, usually less than one quarter the length of the lemma. Rhachilla not produced into a bristle. Lemma glabrous.

2. Awn absent, or if present then minute and delicate (sometimes present, exserted and as long as the lemma in forms of *A. Muelleriana*). Spikelets 1.5-2.5 mm. long.

3. Panicle usually over 12 cm. and up to 35 cm. long, with long, verticillate, capillary, more or less spreading branches, shortly exserted or the base enclosed in the uppermost sheath. Culms 3-noded. Leaves flat, 2-3 mm. wide or more, scabrous.

1. *Agrostis hiemalis*

3*. Panicle usually under 15 cm. long. Culms usually less than 40 cm. high, very slender, erect. Leaves very fine.

4. Panicle spreading. Anthers about 0.4 mm. long.

5. Panicle much exserted on a long, smooth peduncle, pyramidal, the branches slender but scarcely capillary, 1-3-nate but scarcely verticillate. Leaves very narrow, almost smooth except on the margins and at the apex, very thin, crowded at the base.

2. *Agrostis parviflora*

5*. Panicle not or only shortly exserted, spreading from above, the branches capillary. Culms leafy. Lemma microscaberulous.

4. *Agrostis australiensis*

4*. Panicle contracted. Anthers about 0.6-0.8 mm. long. Lemma smooth. Awn sometimes present, very fine, attached about the middle.

3. *Agrostis Muelleriana*

2*. Awn present, one and a half times to twice as long as the glumes.

6. Panicle capillary, the branches spreading above when young, the whole divaricately spreading at maturity, broadly pyramidal in outline. Awn inserted near the base or middle of the lemma. Spikelets 2.5-4 mm. long.

5. *Agrostis venusta*

6*. Panicle rather contracted, more or less lanceolate in outline, the branches erect or somewhat spreading, floriferous almost to their bases. Spikelets about 2 mm. long.

6. *Agrostis Boormanii*

1*. Palea present, half as long to as long as the lemma.

7. Lemma glabrous.

8. Awn absent or minute and delicate.

9. Glumes more or less scabrous on the keels, smooth or minutely scaberulous on the sides.

10. Glumes narrow, the lower one about 2.7 mm. long, both much exceeding the lemma. Rhachilla produced into a short, subglabrous bristle.

9. *Agrostis limitanea*

10*. Glumes rather broad, about 2 mm. long, only shortly exceeding the lemma. Rhachilla not or scarcely produced.

7. *Agrostis aequata*

9*. Glumes distinctly scabrous on the sides as well as on the keels. Sheaths, blades and culms very scabrous. Culms geniculate at the lower nodes. Panicle large with long, verticillate, spreading branches.

9. *Agrostis rudis*

8*. Awn well developed, exserted.

11. Awn straight, shortly exserted, attached above the middle of the lemma. Lemma smooth, about 2.5 mm. long, very shortly 4-toothed. Glumes shortly exceeding the lemma. Spikelets 3-3.5 mm. long.

10. *Agrostis Adamsonii*

11*. Awn much exserted, geniculate, twisted in the lower part, attached to the lemma at or below the middle. Glumes much exceeding the lemma. Lemma 3-4.5 mm. long, smooth or micro-scaberulous, 4-toothed, 2 of the teeth rather long. Spikelets 4.5-7.5 (usually 5-6) mm. long.

12. Littoral or sublittoral species. Blades broad, 3-7 mm. Glumes often scabrous on the sides. Anthers 0.7-0.9 mm. long.

11. *Agrostis Billardieri*

12*. Not littoral in habitat. Blades narrow, less than 2 mm. wide.

13. Plant slender. Blades thin, usually flat. Anthers about 1.5 mm. long. Glumes smooth on the sides.

11A. *Agrostis Billardieri* var. *filifolia.*

13*. Plant tall, robust. Blades rather firm, inrolled. Anthers about 0.6 mm. long. Lemma distinctly scaberulous in the upper part. Glumes smooth or scaberulous on the sides, conspicuously scabrous to scabrous-pubescent on the keels.

11B. *Agrostis Billardieri* var. *robusta*

7*. Lemma hairy on the back. Awn distinct.

14. Culms smooth below the panicle. Plant very slender.

15. Lemma 4 toothed, the two lateral teeth very long from 0.5-1.5 mm. Panicle diffuse but not very broad, lanceolate, about 5-10 cm. x 1-2 cm. Blades flat or loosely convolute.

12. *Agrostis plebeia*

15*. Lemma truncate, only minutely 4-toothed. Panicle loosely contracted, linear to narrow lanceolate, 4-15 cm. long. Blades very fine, inrolled.

14 *Agrostis Preissii*

14*. Culms very retrorsely scabrous below the panicle.

16. Panicle lanceolate, loosely contracted, comparatively dense or at length more spreading, the branches floriferous from within 2.5 cm. of their bases. Spikelets 6-8 mm. long. Lemma 2.7-3.2 mm. long. Awn rather strong. West Australian species.

13. *Agrostis Drummondiana*

16*. Branches of the panicle spreading above when young, the panicle large and very widely spreading at maturity. Branches sterile at their bases for 3-8 cm., or if shorter, then the whole plant rather small. Awn usually slender.

17. Spikelets 2-4 mm. long, seldom longer, usually light green or straw-coloured, sometimes slightly tinged with purple. Lemma 1.3-2 mm. long, shortly 4-toothed. Blades (at least the lower ones) usually narrow, about 2 mm. wide. Panicle branches often somewhat drooping when young.

18. Annual. Anthers 0.2-0.4 mm. long, broadly oblong.

15. *Agrostis avenacea*

18*. Perennial. Anthers about 0.7 mm. long.

15a. *Agrostis avenacea* var. *perennis*

17*. Spikelets 3.5-6 mm. (usually about 5 mm.) long, usually strongly tinged with purple. Anthers 0.6-1.2 mm. long, narrow oblong to linear. Panicle branches erect or rather stiffly spreading when young, not drooping. Annuals.

19. Lemma 1.8-3 mm. long, either shortly and equally 4-toothed, or in larger specimens the 2 lateral teeth often prolonged. Blades 2-7 mm. wide, flat. Anthers 0.6-1.2 mm. long.

16. *Agrostis aemula*

19*. Lemma 3-3.5 mm. long, excluding the 0.5-1 mm. long lateral teeth, microscaberulous. Blades very narrow, inrolled, subsetaceous, scabrous on the inner surface. Anthers about 1.2 mm. long.

16a. *Agrostis aemula* var. *setifolia*

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ADDITIONS TO THE AUSTRALIAN FLORA.

W. F. BLAKELY.

Bertya mollissima n. sp.

FRUTEX gracilis dense stellato-tomentosus 1-3 m. altus, ramulis et alabastris aureo-tomentosis; foliis alternatis breviter petiolatis, oblongis obtusis 10-18 mm. longis, 3-5 mm. latis, marginibus planis vel recurvis; floribus axillaribus, perianthio flororum masculorum breviter pedunculato 5-bracteato, bracteis lanceolatis inaequalibus; sepalis 5 petaloideis 4 mm. longis, 3 mm. latis oblongis vel lanceolatis supra glabris subtus plus minusve stellato-tomentosis; perianthio flororum femineorum breviter pedunculato et pedicellato 2-4 bracteato; sepalis 5 persistentibus lanceolatis vel acuminatis supra basim partim conjunctis; ovario dense stellato-tomentoso; ramis styli 6; capsula pedicellata cylindracea acuta 8 x 4 mm.

A slender densely stellate-tomentose shrub of 4 to 9 feet (about 1-3 m.), the young branches and flower buds golden-tomentose; leaves alternate, shortly petiolate, oblong, obtuse, 10-18 x 3-5 mm., subconcave, the margins flat or recurved, channelled, dark green above, intensely hoary-stellate beneath, the midrib very prominent; flowers axillary, solitary or sometimes the male and females together in the upper axils. Male perianth shortly pedunculate, surrounded by five small, lanceolate, concave, hoary, stellate-tomentose deciduous bracts, the two lower ones narrower and shorter than the three upper ones, one of which is larger than the others. Sepals 5, petaloid, 4 x 3 mm., oblong to lanceolate, concave, glabrous above, partly stellate-tomentose beneath; staminal column conical, 5-6 mm. long; stamens very numerous. Female perianth shortly pedunculate, with two or four stellate-tomentose deciduous bracts at the base, the five persistent acutely lanceolate to acuminate, stellate-tomentose lobes united below the middle into a cup, the whole 4-5 mm. long, not enlarged under the fruit. Ovary densely stellate-tomentose, scarcely exceeding the sepals, conical, contracted at the top into a short neck; styles three, each with two subulate branches about 1 mm. long, purple-brown above, stellate beneath. Capsule pedicellate cylindroid, acute, 8 x 4 mm., the pedicel longer and thicker than the peduncle, seeds 5 x 3 mm., oblong, smooth and glossy, light brown, slightly mottled; caruncle subpeltate, thin and small.

Loc. : New South Wales: Belmont, 42 miles east of Scone, Rev. H. M. R. Rupp, 6/1939; Pokolbin, R. H. Cambage, 8/1910; Liverpool Range, near Kar's Gap, R. H. Cambage, No. 2,520, 1/11/1909; Warrumbungle Ranges, W. Forsyth, 10/1899, the type.

Near *B. oleaefolia* Planch., from which it differs in the shorter, broader, more obtuse leaves, stellate-tomentose perianth lobes of the male flowers, partly united sepals of the female perianth, fewer bracts, and in the smaller and narrower segments of the capsule, which do not enlarge as the capsule develops.

Bertya astrotricha n. sp.

Frutex gracilis 1-2 m. altus, ramis dense stellato-tomentosis; foliis alternatis petiolatis oblongis vel oblongo-lanceolatis mollibus supra viridibus, infra pallidis dense stellato-tomentosis, 3-5 cm. longis 1 cm. latis; floribus axillaribus, pedunculis filiformibus bracteatis stellato-tomentosis 10-25 mm. longis; bracteis subulatis 3-5 mm. longis; sepalis flororum masculorum petaloideis oblongo-lanceolatis 4-5 mm. longis 3 mm. latis; floribus femineis breviter pedicellatis, sepalis rigidis acuminatis 3-4 mm. longis; ovario dense stellato-tomentoso; ramis styli 12-15, 4-6 mm. longis; capsula pedicellata cylindracea 9-10 mm. longa 3-4 mm. lata.

A slender shrub of 4-10 feet (about 1-3 m.); branches densely covered with a loose stellate, stipitate tomentum, the tips and young leaves rusty-tomentose. Leaves alternate, petiolate, oblong to oblong-lanceolate, dull, soft and brittle, light green and minutely stellate-tomentose and channelled above, pale and closely stellate-tomentose beneath, 3-5 cm. long, up to 1 cm. broad, the margins flat, sinuolate, the midrib prominent beneath. Flowers axillary, on filiform bracteolate, stellate-tomentose peduncles 10-25 mm. long. Male perianth sessile, surrounded by four or five subulate, stellate-tomentose bracts, the two outer ones 4-5 mm. long, longer than the inner ones; sepals five, petaloid, obtusely lanceolate, glabrous, greenish-white, 4-5 x 3 mm. Staminal column cylindrical, 6 mm. long, the stamens rather short. Female perianth shortly pedicellate, the pedicel glabrous, thicker than the peduncle, the bracts spreading, subulate, stellate-tomentose, 3-5 mm. long. Sepals glabrous, rigid, accuminate, 3-4 mm. long, slightly enlarged under the fruit. Ovary densely stellate-tomentose, but soon glabrous; style branches 12 to 15, 4-6 mm. long. Capsule pedicellate, cylindroid, 9-10 mm. long, 3-4 mm. broad. Seeds oblong, dark brown, glossy, 7-8 mm. long, 3 mm. broad. Caruncle broadly and acutely conical, 1 mm. long.

It is usually confined to deep, shady, moist sandstone gullies, and to the miniature rain forests of the coast range.

Loc.: New South Wales: Dee Why, J. L. Boorman, 4.1922; Big Bend, Cockle Creek, Hornsby, 5.1921, W. F. Blakely and D. W. C. Shiress; Kuring-gai Chase, near Mt. Colah boundary line, W. F. Blakely, 5.1920; Connelly's Creek, 1½ miles north-west of Mt. Colah, W. F. Blakely and D. W. C. Shiress, 6.1918, the type; Cedar Creek, Cowan, same collectors, 12.9.1926; Junction of the northern arm of Mullet Creek, W. F. Blakely, 10.1925; Broken Bags, State Forest, F. M. Bailey, 9.1929.

It is closely allied to *B. pomaderrioides* F. Muell., from which it is readily distinguished by its longer and broader very soft loosely stellate-tomentose, sinuolate leaves, broader male bracts, longer and narrower female bracts, minutely stellate female sepals, densely stellate-tomentose ovary, and more numerous and longer styles. *B. pomaderrioides* seems to be confined to the southern and western districts, while *B. astrotricha* does not appear to extend south of Sydney.

Bertya pomaderrioides F. Muell. var. *angustifolia,* n. var.

Variat in ramis glabris et foliis lineari-lanceolatis.

A glabrous and slightly resinous virgate shrub. Leaves linear-oblong to linear-lanceolate, petiolate, straight or curved, 10-25 mm. long, 3-4 mm. broad, the margins revolute, smooth and channelled above, hoary beneath with a minutely hairy tomentum, except the prominent midrib. Peduncles glabrous, much shorter than the leaves. Male flowers sessile, with four small linear bracts at the base, sepals glabrous, obovate, concave, 4 x 3 mm. Staminal column ovate, as long as the sepals. Female flowers shortly pedicellate at the apex of the bracteate peduncle; bracts four, linear, unequal, 1.5-2.5 mm. Sepals linear, 3 mm. long, not enlarged under the fruits. Ovary slightly stellate-tomentose; style branches 6-9. Capsule cylindrical, 10 x 3 mm. Woronora River, E. Cheel, 15.9.1923.

It is readily distinguished from the species by the glabrous branches and linear-lanceolate leaves.

Pultenaea Forsythiana n. sp.

Frutex ramulis teretibus pubescentibus; foliis alternatis breviter petiolatis, lanceolatis pungentibus 1-nervatis, planis vel aliquantum concavis 6-12 mm. longis 1.5-2 mm. latis; stipulis subulatis tenuibus 2-3 mm. longis; floribus 3-4, terminale confertis, bracteolis subtus tubum calycis instructis, carinatis, hirsutis, 3.5 mm. longis; caylce glabro tenue plurinervato 5 mm. longo 3 mm. lato; vexillo alisque flavis, carina ad apicem purpureofusca; ovario dense hirsuto; stylo gracile, aliquantum hirsuto.

A shrub with terete, pubescent branchlets. Leaves alternate, shortly petiolate, lanceolate, pungent, narrowed into the base, 1-nerved, flat or somewhat concave, paler on the lower surface than on the upper, 6-12 x 1.5-2 mm. Stipules subulate, concave, very thin, 2-3 mm. long, bristle-like when old, flowers 3-4 in terminal heads, bracteoles attached below the calyx-tube, keeled, densely hirsute, except the sides, longer or rarely shorter than the calyx-tube, 3.5 mm. long. Calyx glabrous, thin, several nerved, including the subulate lobes, 5 mm. long, 3 mm. broad at the top of the tube, the lobes minutely tomentose inside; standard and wings yellow; keel purple-brown at the top, yellow below. Ovary densely hairy; style slender, slightly hairy.

Loc.: New South Wales: Lobbs Hole, W. Forsyth, 11.1900, the type.

Victoria: Mitta Mitta, A. Meebold, No. 21,744, 12.1936; Watts River, C. Walter, 12.1894.

This has been determined as *P. juniperina* Labill. by different workers, but it differs from that species in the broader leaves which are non-cordate at the base, strictly terminal flowers, glabrous and ribbed calyces, longer bracteoles, and in being less pungent throughout. The flowers are also more uniformly yellow than those of *P. juniperina.*

Pultenaea Forsythiana Blakely. var. *uniflora* n. var.

Variat floribus solitariis et bracteolis subulatis.

Branches terete, densely rusty tomentose, with a very short, close tomentum Leaves as in the species, flowers solitary, axillary, on short pubescent pedicels. Calyx glabrous; bracteoles subulate, slightly hairy, as long as the calyx-tube; ovary hairy.

Loc.: New South Wales: Brindabella Mountain, Federal Capital Territory, R. H. Cambage, No. 3334, 10.12.1911.

Victoria: Lilyvale, A. H. S. Lucas.

This marked variety has the aspect of *P. flexilis* Sm., var. *mucronata* Benth., but the branches are densely tomentose, the bracteoles different, and the ovary is very villous.

Pultenaea trinervia n. sp.

Frutex gracilis 1-3 m. altus, ramulis quadrangularibus virgatis paulo hirsutis; foliis plerumque oppositis rectis, linearibus mucronatis subtus 3-nervatis, 12-26 mm. longis 2 mm. latis, stipulis subulatis parvis; floribus axillaribus, solitariis, pedicellis brevibus hirsutis bracteatis; calcyce hirsuto lobis acuminatis 5 mm. longis; vexillo orbiculare-reniforme circa 9 mm. lato et longo flavo; carina et alis flavis circa 7 mm. longis; ovario dense hirsuto, legumine oblique ovato vel late cultriforme 9 x 4 mm.

A slender shrub of 4-9 feet, with quadrangular, virgate, slightly hairy branchlets. Leaves mostly opposite, straight, linear, mucronate, 3-nerved beneath, with a few distant, prominent, lateral veins, glabrous or hairy beneath, tapering into very short hairy petioles, 12-26 mm. long, 2 mm. broad. Stipules subulate, about as long as the petioles. Flowers axillary, solitary or in pairs on short, hairy bracteate pedicels.

Calyx hairy with short, appressed hairs, 5 mm. long, the three lower lobes acuminate, about as long as the tube, the two upper ones falcate, shorter than the lower lobes, all minutely tomentose inside. Standard, wings and keel yellow, the former orbicular-reniform, about 9 x 9 mm., the wings and keel 7 mm. long. Ovary densely hairy with appressed hairs, which extend to about the middle of the long, slender style. Pod obliquely ovate to almost cultriform, straight along the dorsal suture and tapering into a long, almost pungent point, 9 x 4 mm. Seeds not seen.

Loc.: New South Wales: Milton, R. H. Cambage, No. 1401; Box Point to Kangaroo River, J. H. Maiden, 10.1808, the type; Robertson, J. H. Maiden, 11.1905; Bulli Pass, W. A. Dixon, 10.1903; South Clifton, A. A. Hamilton, 1.1902; Stanwell Park to Otford, W. F. Blakely, 10.1922; Otford, J. H. Camfield, 11.1897; Port Hacking River, J. H. Camfield, 10.1897; Waterfall, same collector, 1.1897; Tuggerah, J. L. Boorman, 9.1903.

It has been confused with *P. flexilis* Sm. from which it differs in the hairy branchlets, trinerved leaves, hairy calyces with longer, acuminate lobes, smaller and hairy bracteoles, very hirsute, acuminate ovary, and in the much larger, somewhat cultriform pods.

Pultenaea juniperina Labill, var. *leiocalyx* n. var.

Variat in inflorescentia terminale et calyce glabro.

Flowers apparently all terminal. Calyx glabrous on the outside, otherwise similar to the type. This appears to be less common than the typical form with the calyx densely invested with dark-coloured hairs.

Loc.: Tasmania: Circular Head to Forest, R. Gunn, No. 179, 1.11.1837; Circular Head Forest, R. Gunn, quoted as No. 179, 12.1.1838; near Russell Falls, R. H. Cambage, No. 2554, 23.1.1911.

New South Wales: Mt. Kosciusko, up to 5,554 feet, J. H. Maiden, 1.1898.

Zieria adenophora n. sp.

Frutex parvus divaricatus; ramis gracilibus teretibus minute pubescentibus multis glandibus; foliis oppositis vel alternatis, trifoliatis; foliolis obovatis 3-4 mm. longis, 2-3 mm. latis, tuberculatis glandibus, glabris vel juvenilibus leviter pubescentibus; floribus axillaribus, plerumque solitariis, pedicellis glandularibus quam foliolos brevioribus; lobis calycis latis, obtusis, circa 1 mm. longis; petalis in alabastris valvatis, ovato-lanceolatis, minute pubescentibus, 2-3 mm. longis; antheris orbicularibus haud apiculatis; coccis ovatis glabris 2-3 mm. longis.

A small divaricate shrub; branches slender, terete, minutely pubescent and very glandular. Leaves opposite and alternate, trifoliate; leaflets shortly petiolate, obovate, 3-4 x 2-3 mm., the margins slightly revolute, prominently glandular-tuberculate, glabrous or slightly hairy when young; common petiole very short and glandular. Flowers axillary, usually solitary on glandular pedicels shorter than the leaflets; calyx lobes broad, obtuse, glandulose, about 1 mm. long; petals valvate in bud, ovate-lanceolate, white or pale pink, minutely pubescent, 2-3 mm. long; anthers orbicular, not apiculate. Cocci ovate, glabrous, 2-3 mm. long.

Loc.: New South Wales: Bells Creek Falls, Araluen, W. Baeuerlen, September, 1890.

It is near *Z. robusta* Maid. & Betche, from which it is readily distinguished by its much smaller, very glandular leaves, and solitary flowers.

Phebalium glandulosum Hook. var. *eglandulosa* n. var.

Variat ramis sine glandibus et foliis laevibus.

Branches and leaves free from prominent glandular tubercules. Leaves linear-oblong, 6 x 1 mm., smooth and shining above, silvery scurfy and dotted with rusty spots beneath, the margins revolute, the apex incurved or slightly bilobed; glands few or none. Flowers smaller than those of the species.

Loc.: N.S.W.: "A low shrub, on bare acid granite rocks," Torrington, R. H. Cambage, No. 1723, 29.9.1907, the type; same locality, J. L. Boorman, 10.1911.

The non-glandular branches and differently shaped smooth leaves distinguish it from the species.

Eriostemon myoporoides DC. var. *acuta* n. var.

Variat foliis brevioribus et valde acutis.

It differs from the species in the shorter and very acute leaves. The leaves also are much narrower than those of *E. myoporoides* var. *minor* Benth. (*E. intermedius* Hook.)

Leaves sessile, narrow lanceolate, sometimes acuminate, usually broad at the base. Flowers clustered in the axils.

Loc.: N.S.W.: Mirrool, Mrs. J. E. McLean, 9.1938. "Shrub 2-3 feet high and about the same across," 10 miles north of Grenfell, R. H. Cambage, 1.5.1900, the type; Naradham Hills, Lachlan River, Home, 8.1891; Elong Elong, J. G. Sullivan, 1.1938 (with very crowded leaves); Shuttleton, P. E. Lervis, 1908; Ruby Creek, Wilson's Downfall, R. H. Cambage, No. 13, 11.1905.

Correa leucoclada Lindl.

This species is readily distinguished from *C. speciosa* Andr. and *C. virens* Sm. by the colour of the flowers, hoary vestiture and larger calyx.

Loc.: N.S.W.: Dripstone, Wellington, Bingara, Queensland: Stanthorpe.

Hibbertia dentata R. Br. var. *calva* n. var.

Variat in planta tota glabra.

The whole plant strictly glabrous; pedicels slender, up to 3.5 cm. long; flowers similar to those of the species in size and colour, but the sepals perfectly glabrous.

Loc.: N.S.W.: Mt. Imlay, near Eden, J. L. Boorman, 12.1916; Conjola, W. Heron, 9.1898; Arncliffe, R. H. Anderson, 9.1920, the type; Port Stephens, J. L. Boorman, 8.1911.

Brachyloma daphnoides Benth., var. *glabrum* n. var.

Variat in ramis foliisque glabrissimis et floribus parvioribus.

Branchlets and leaves strictly glabrous; leaves orbicular to oblong-elliptical, rather thick, prominently striate beneath, 5-9 x 3-4 mm. Flowers as in the species, but sometimes smaller, the sepals rather short, glabrous or nearly so, fruit depressed-globular, ribbed 3 x 3 mm.

Loc.: N.S.W.: Temora, Bishop Dwyer, 10.1914 and 10.1915; Tumut, E. Breakwell, 10.1912; Murrumbidgee district, T. Duff, 1882, the type; Albury, J. Frauenfelder, 9.1917; Emily H. Rothery, 11.1939.

Victoria: Chiltern, J. Staer, 4.1911; Bacchus Marsh, C. Walter, 10.1898; St. Bernard road, A. Morris, 9.1926; Mt. Abrupt, H. B. Williamson, 10.1901; Victoria Ranges, H. B. Williamson, 11.1901.

CONTRIBUTIONS TO THE NEW SOUTH WALES ORCHIDACEAE.

H. M. R. Rupp.

Pterostylis longicurva, n. sp.

Planta gracilis, 15-22 cm. alta. Folia 3-5, parva, caulem ascendentia. Flos solitarius, striatus, a basi ad galeae apicem 2-3 cm. Galea acuta; petala obtusa, galeae aequalia. Sepala lateralia paulum gibbosa, multo trans galeam extendentia, ad apices filamentosa. Labellum angustissimum, 11-15 mm. longum, magnopere recurvum; appendix ad apicem furcata. Columna brevissima, erecta, alis brevibus latisque.

A slender plant, from 15 to 22 cm. high. Leaves rather small, ascending the stem, similar to those of *P. reflexa* R.Br. and other allied species. Flower solitary, striate, 2-3 cm. long from its base to the tip of the galea. Galea acute, petals obtuse, as long as the galea, often quite free from it for nearly half their length. Lateral sepals only slightly gibbous below the sinus; prolonged well beyond the galea into erect filamentose points. Labellum very narrow, 11-15 mm. long (almost twice as long as the column), its front half greatly recurved: appendage forked at the apex. Column very short, erect, with short and broad wings of a dusky colour.

Loc.: New South Wales: Nandewar Range, near the Horton Falls, Barraba district, April, 1914, H. M. R. Rupp, the type; Nundle, Peel River, June, 1906, J. H. Maiden and J. L. Boorman.

The affinities of this plant appear to be with *P. alata* Reichb. f., and *P. reflexa* R.Br., but it exhibits marked differences from either in the labellum and column, as shown in the accompanying figures. I have always believed it to be a distinct species; but most of my specimens were sent in 1914 to the National Herbarium, and I left the district before the next flowering-time. I have not come across it since: but in the National Herbarium at Sydney I have found my 1914 specimens, and also some collected near Nundle in 1906 by J. H. Maiden and J. L. Boorman, which I have critically examined; and I am satisfied of their identity with mine from the Nandewar Range. They were labelled *P. reflexa;* while mine were labelled *P. praecox* (a synonym of *P. alata*); the compromise suggests that there was some doubt about the species.

The general appearance of the flower certainly reminds one of *P. alata;* but the labellum is entirely different from that of the latter. It is of a similar type to that of *P. reflexa,* but is narrower and longer; while the column is as different from that of *P. reflexa* as the labellum is from that of *P. alata.*

The proposed specific name refers to the strikingly long-curved labellum.

Diuris rhomboidalis, n. sp.

Planta gracilis, 20-35 cm. alta. Folia plerumque 3, late linearia, 8-12 cm. longa. Flores 3-8, leviter *D. pedunculata* similes, sed parviores pallidioresque. Pedunculi et bractei subtendentes longi. Sepalum dorsale circiter 5 mm. longum, vix recurvum. Sepala lateralia 8-9 mm. longa, viridia, linearia, prope directa. Petala ovata unguibus longis, 8-9 mm. Labellum 5 mm. longum, cum jugis longitudinalibus duobus non ad lobum medium extendentibus: lobi laterales parvissimi, lobus medius rhomboidalis. Columna in speciminibus praesentibus obscura.

A tall, slender plant up to 35 cm. high. Leaves usually three, broad-linear, not exceeding 12 cm. in length. Flowers 3-8, superficially resembling those of *D. pedunculata* R.Br., but smaller and paler-yellow. Peduncles and floral bracts long, the latter prominent. Dorsal sepal about 5 mm. long, hardly recurved. Lateral sepals 8 or 9 mm. long, dark-green, narrow-linear, almost straight. Petals ovate on long very fine claws, with the latter as long as the lateral sepals. Labellum scarcely longer than the dorsal sepal, with two longitudinal ridges along the lamina, ending abruptly at the base of

Explanation of Plate.

Fig.

1 and 2. *Diuris rhomboidalis*, natural size.

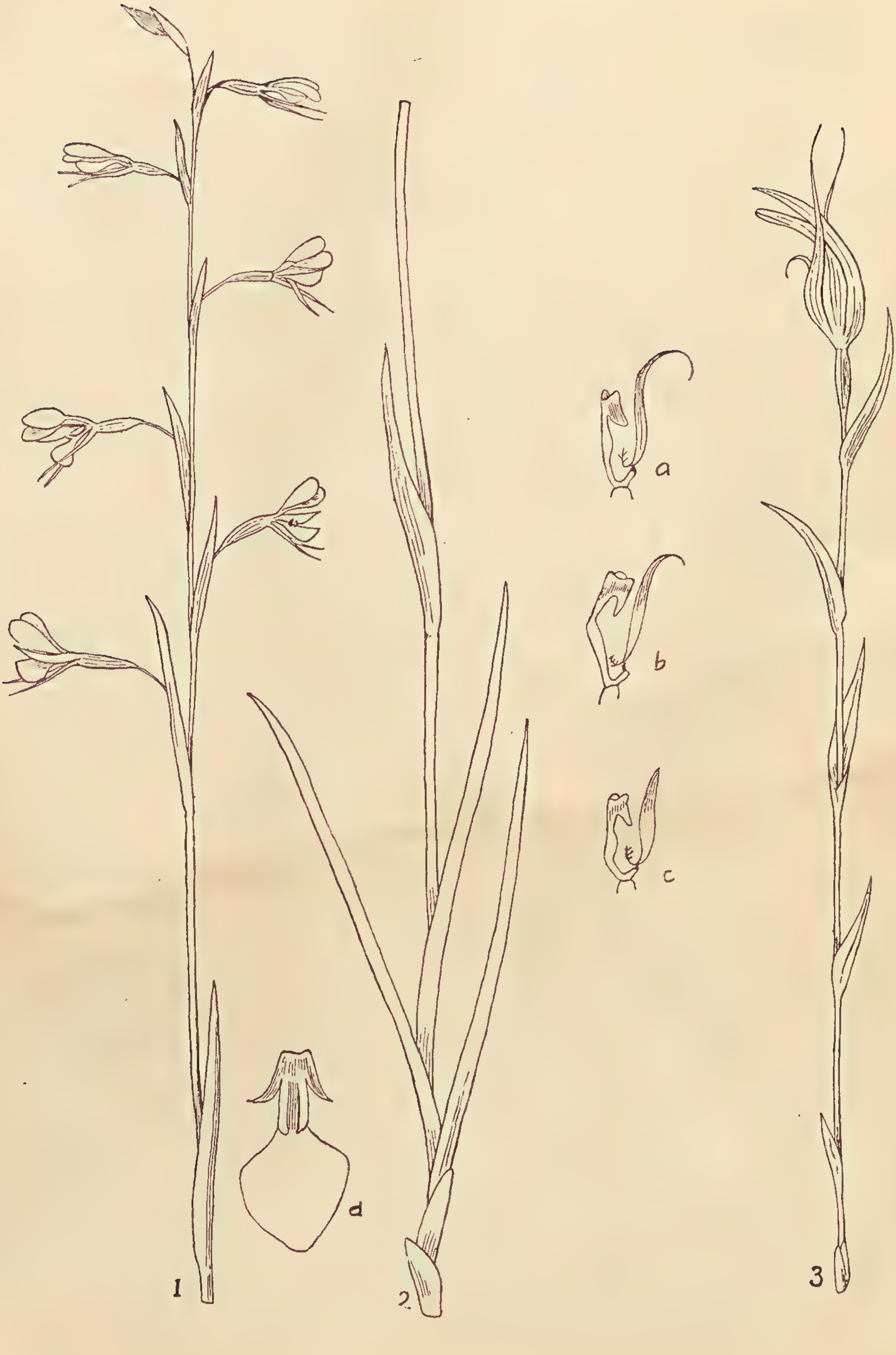
(*d*) Labellum enlarged and flattened out.

3. *Pterostylis longicurva.*

(*a*) Enlargement of labellum and column of *P. longicurva.*

(*b*) Enlargement of labellum and column of *P. reflexa.*

(*c*) Enlargement of labellum and column of *P. alata*


a
b
c
d
1
2
3

the median lobe. Lateral lobes very small, median lobe approximately rhomboid in contour. Column obscure in the dried material available; apparently resembling that of *D. bracteata* Fitzg.

Loc.: New South Wales: Torrington, R. H. Cambage, 30.9.1907; Warialda, H. M. R. Rupp, Sept., 1917, the type.

I first saw this species of *Diuris* even earlier than 1907, near Warialda, and could not reconcile it with any description available to me. Various circumstances hindered me from dealing with it either then or when I found it again during a visit to the same district in 1917. Recently I came upon Cambage's specimens in the National Herbarium at Sydney; and one of these, with one in my own herbarium, were in good enough condition at least to satisfy me that the plant was an undescribed species. It resembles *D. pedunculata* in the somewhat nodding habit and general "set" of the flowers; but this resemblance is quite superficial, as I think the above description will indicate. There is a note on one sheet of Cambage's specimens, in the handwriting of Ernest Betche; "Near *D. pedunculata,* but not identical"; and with that comment I agree. The labellum is certainly not that of Brown's species. Fresh material is very desirable in order to determine the details of the column.

Zeuxine attenuata Rogers & White. (Proc. Roy. Soc., Queensland, xxxii, No. 9, p. 123. 1920.)

In Maiden and Betche's "Census of N.S.W. Plants" (1916), there will be found recorded the saprophytic orchid *Cheirostylis grandiflora* Blume, which up to that time had been known only in New Guinea. The record was based on the determination of two small specimens discovered near Lismore, on the Richmond River, by H. Finselbach. Subsequently a third and better specimen was added, found by F. Bate on Chatsworth Island, in the Clarence River, some 60 miles further south.

After several inspections of these specimens in the National Herbarium at Sydney, I was puzzled to know why Blume should have chosen the name "grandiflora" to designate a species with such diminutive flowers; and when later on I became a little better acquainted with the genus *Cheirostylis* through the Queensland *C. ovata* Bail. (syn. *Gastrodia ovata* Bail.) I began to have doubts as to whether the National Herbarium specimens could rightly be included in that genus.

J. H. Maiden called attention to Finselbach's discovery in a Note in the Proceedings of the Linnean Society of N.S.W. (xxi. p. 625, 1896). In this note he emphasises the interest of the occurrence of this supposed New Guinea saprophyte so far south; and he also suggests that possibly it might be found identical with one or other of two Queensland orchids then very imperfectly known, but now determined respectively as *Cheirostylis ovata* Bail. and *Anoectochilus Yatesae* Bail. I am well acquainted with both of these through specimens sent to me from Cairns, N.Q., and can state definitely that they are very distinct both from each other and from the plants now under discussion.

I have now completed an examination, as careful and as exhaustive as the material would allow, of these specimens in the National Herbarium labelled *Cheirostylis grandiflora,* and have compared them with Blume's excellent plate and detailed drawings in Orch. Archip. Ind., and also with various specimens and drawings in my own herbarium. As a result of this examination I am satisfied that the specimens do not belong to *Cheirostylis* but to Lindley's genus *Zeuxine,* and that they are in fact specimens of *Z. attenuata* Rogers & White (loc. cit. supra). At the time of Maiden & Betche's determination, the genus *Zeuxine* was not recorded in Australia; and since it is not far removed from *Cheirostylis,* one can understand that a mistake might easily be made when dealing with imperfect material of a strange orchid with very small flowers. The interest of the discovery alluded to by Maiden is not greatly lessened by the new determination; for in Queensland *Zeuxine* has hitherto only been found in the tropics (two species); and *Z. attenuata* has not, so far as I am aware, been recorded south of Mackay.

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BACKHOUSIA ANISATA: A NEW SPECIES OF MYRTACEAE.

Joyce W. Vickery, M.Sc.

Backhousia anisata n. sp. Arbor glaber, maiusculus, ad. 50 m. altus et 4 m. diam., saepe ad basem auctus, interdum surculis numerosis, in silvis humidis vel ad flumines habitans; cortex tenuisculus, subfibrosus, rubro-fuscus; folia opposita, breve petiolata, petiolis circa 5 mm. longis; laminae lanceolatae vel angusto-lanceolatae, in apicibus longis acuminatibus contractae, integrae, undulatae, virides, supra lucidiusculae, pellucido-punctulatae, fragrantes, anisato-olentes, nervo primo subter manifestiusculo, nervis secondariis numerosis, plus minusve parallelis, angulos 60-70° cum nervo primo fingentibus, nervo intramarginale vix prominente; inflorescentia axillaris vel terminalis, paniculata; rami paniculae compressiusculi, uvas umbellatas 2-9- (plerumque 3-) flores ferentes; bracteae caducae; alabastri angusto-turbinati, 3-5 mm. longi; flores cremeo-albidi, fragrantes, breve pedicellati; tubus calycis turbinatus, ovarium subter adnatus, circa 3 mm. longus, viridescens; lobi calycis 4-5, breves (1-2 mm.), lati, obtusi et rotundati vel tandem plus minusve deltoidei et acuti, persistentes; petala plus minusve orbiculares, cupuliformes, circa 3 mm. diam.; stamina numerosa, multiseriata, filamentibus petala multus excedentibus, antheribus latissimo-oblongis vel subglobulis, circa 0.3-0.4 mm. longis, basifixis, 2 loculis parallelis longitudinaliter dehiscentibus, stylus recurvatus in floribus, tandem erectus, persistens, circa 5 mm. longus, stigmate parvo; ovarium in tubo calycis depressum in floribus, tandem in fructibus tubum aequalans propter incrementum pulvini supra loculos, 2 loculare; ovuli pauci, axem adnati; capsula in tubo calycis persistente inclusa, 4-5 lobos calycis persistentes patentes ferens, sicca, indehiscens, turbinata vel paullo campanulata, 3-4 mm. long, pallido-fusca; semina pauca (circa 4-8) oblonga, angulares, rubida.

Loc.: New South Wales: Bellingen, B. B. Rickerby, 4.5.1939 (Fruit) and 26.10.1939 (Flower) Type; Boggy Creek, Bellinger River, E. Swain, 3.1910; Bellingen, E. H. F. Swain, 6.1911.

A fairly large glabrous tree up to 50 m. high and 4 m. trunk circumference, often with an enlarged base, sometimes suckering freely, inhabiting rain forests or near water courses; bark rather thin, rough, subfibrous, corky, reddish-brown; leaves opposite, shortly petiolate, the petioles about 5 mm. long; blades lanceolate to narrow-lanceolate, narrowing into a long, acuminate apex, entire, undulate, bright-green, somewhat shining above, pellucid-dotted, fragrant, with an aniseed odour when crushed, the midrib rather prominent on the lower surface, the lateral veins making an angle of about 60-70° with the midrib, fairly numerous, more or less parallel, connected with reticulate veins, the intramarginal vein not prominent; inflorescence axillary or terminal, paniculate, the panicle branches somewhat flattened, bearing umbel-like groups of 2-9 (usually 3) flowers; bracts caducous; buds narrow turbinate, 3-5 mm. long; flowers creamy-white, fragrant, shortly pedicellate; calyx tube turbinate, adnate to the ovary in the lower part about 3 mm. long, greenish; calyx lobes 4 or 5, short (1-2 mm.), broad, obtuse and rounded or at length more or less deltoid acute, persistent, whitish in the flower, light-brown in the fruit; petals whitish, more or less orbicular, cupuliform, about 3 mm. diameter; stamens numerous, in numerous whorls, the filaments much exceeding the petals; anthers very broadly oblong, to almost globular, about 0.3-0.4 mm. long, opening in two parallel slits, basifixed; style recurved until after flowering, at length erect, persistent, about 5 mm. long, the stigma small; ovary sunk in the calyx tube in the flower, at length flush with the top of the calyx tube in the fruit due to growth of a pad of tissue above the loculus, 2-celled; ovules few, attached to the axis; capsule included in the persistent calyx tube, dry, indehiscent, turbinate, or somewhat campanulate, 3-4 mm. long, light-brown in colour, bearing the four or five persistent, spreading calyx lobes; seeds few (about 4-6), oblong, angular, reddish-brown. This species is readily distinguished from other species of *Backhousia* by the paniculate inflorescence, and characteristic aniseed odour of the foliage.

Vernacular Names: "Ringwood," "Aniseed Tree."

The following field notes and comments on the timber have been compiled from information supplied by the two collectors, Mr. Rickerby and Mr. Swain. "Ringwood" occurs more or less plentifully throughout the Belilnger River district, except close to the sea. It occurs in the rain forest, chiefly on fairly good soil adjacent to the water courses. It is also common on low brushy ridges. The foliage closely resembles that of *Eugenia Ventenatii,* but the tree is of a more upstanding habit and stiffer appearance. *Backhousia* anisata may be readily distinguished from *Eugenia Ventenatii,* moreover, by the very characteristic odour of aniseed in the oil of the former, which is easily detected when the leaves are crushed. The tree is very free flowering and sweetly scented. It is sometimes small, about 20 feet in height, but at other times attains 150 feet, and may have a trunk circumference of about 12 feet. Some specimens also develop an enlarged base, from which suckers may be given off abundantly. Suckering occurs very freely after ringbarking and this characteristic has at times proved such a nuisance to settlers that it is stated that some clearing contracts have provided that all "Ringwoods" should be felled irrespective of size.

Felled "Ringwood" is very hard to burn as it retains much moisture, and it rots very slowly. White ants are said not to touch it. Some logs have been known to survive fire, moisture and decay for 30-40 years. During the process of decay, the wood peels off in circumferential layers or "jackets" from the exterior, from ring to ring inwards. The rings seem to escape the rot, which occurs between them. In spite of the fire resistance of logs, however, the dry bark and sapwood of a standing tree may be very inflammable, doubtless owing to the presence of abundant oil. The tree is sometimes faulty and hollow, with a decayed interior.

The timber is said to be of practically no commercial value, although it has been used for linings in cottages, and does not readily warp or crack, in addition to having fire, rot, and white-ant resisting qualities.

A transverse section of the bole shows thin, brownish, concentric arcs, apparently the result of formation of vessels with comparatively large luminae side by side in the annual rings. The occurrence of these concentric chains of pores is characteristic and gives the impression that the timber would, upon drying, at once "shell off." Hence, it has not been looked upon as of any value. In the case of one 15-foot long ½-inch lining board which had been lying about a mill yard for two years, Mr. Swain states that it was absolutely straight and unwarped, there was no tangential, radial nor concentric cracking and the timber showed no signs of separating along the concentric rings of small open vessels.

In young trees the colour of the wood is white, in older ones it becomes the colour of Turpentine (Syncarpia laurifolia). The timber darkens superficially with exposure. When planed afresh the wood is rather pretty, and looks like subdued Tulip-wood. The concentric pore chains in tangential section show as dark-brown, longitudinal graining in a reddish ground. The wood is soft and cheesy when green, hardens with age, does not split well, and the medullary rays are very fine, but apparent. The wood is of regular, even grain and planes up well.

Sydney: Thomas Henry Tennant, Government Printer—1941.

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The Genus Swainsona

ALMA T. LEE, M.Sc.

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THIS revision was undertaken primarily because of the unsatisfactory state of our knowledge of the taxonomy of the genus *Swainsona* in New South Wales. The available diagnostic keys predated by many years the publication of a number of species occurring in the State and were, moreover, products of a period ungoverned by the type concept. Hence correct identification of specimens of this genus was a difficult procedure, and official determinations given to enquirers, who were often concerned with the toxic effects of these plants, were, as a result, unreliable. Preliminary attempts to arrive at consistent determinations of such specimens soon made it apparent that the genus as a whole was in need of comprehensive revision. This was made possible by the co-operation of all the major Herbaria in Australia, which generously lent their collections of *Swainsona* for study. Hence a fairly comprehensive view of conditions obtaining in the genus has been possible except in the case of some species from the interior of the continent and parts of Western Australia, collections of which are still too meagre for a reliable opinion to be formed as to their relationships or stage of evolution.

The importance of examining the greatest possible number of collections from the total range of the unit concerned, especially in groups where specific distinction is not clear, has been strikingly apparent throughout the investigation. Examination of limited material led frequently to erroneous conclusions, and has, no doubt, been responsible for the inconsistencies of treatment by different workers in the past. There is no doubt that the scope of this enquiry, extending beyond the commonly adopted limits of state boundaries, has elucidated many intricacies and revealed a number of unsuspected relationships between the constituent members of the genus.

A great many old specimens at the Melbourne Herbarium were found to be unnamed, and both there and at the National Herbarium, Sydney, there were many misidentified specimens. A count among the sheets of *S. phacoides* revealed that no less than nine different names, nearly all in specific rank, had been applied to this one species in various Herbaria. No doubt this resulted from the fact that superficial appearance is apt to be most misleading. Reliable identification is possible only when details of the floral characters, pubescence and leaves have been carefully ascertained.

Since it is based on a comprehensive study of all the available Australian material, it is hoped that this revision will result in a considerably greater degree of consistency than could any more limited investigation. Further, it is considered that a more reliable interpretation of the relationships of species has thus been obtained leading to a reasonably natural classification of the genus, as far as such is possible without experimental or genetical studies. Hence although different identifications may be proposed by other workers, these are likely to concern chiefly differences in interpretation of rank or status.

ACKNOWLEDGMENTS.

For their co-operation in the lending of specimens, supplying of relevant information and for helpful discussions, my sincere thanks are due to Curators and members of staff of the Herbarium of the University of Adelaide, the Botanic Museum and Herbarium at Brisbane, the Herbarium of the Royal Botanic Gardens at Kew, the Melbourne National Herbarium, the State Herbarium at Perth, the Ray Herbarium of the University of Sydney, the United States National Herbarium and the Waite Institute Herbarium; to Dr. J. B. Cleland, who offered his excellent private collection containing many specimens from Central Australia, and to Mr. J. M. Black who made available his notes on the genus as well as his annotated Herbarium sheets. Mr. R. H. Anderson, Curator and Chief Botanist of the National Herbarium of New South Wales, has been generous in providing facilities for the completion of this work, and Miss J. W. Vickery has given much help both by discussion throughout the progress of the work and in the preparation of the publication. For general discussions on Systematics and for comment on particular problems during the earlier stages of the work I am particularly indebted to the late Dr. H. F. Consett Davis. My husband, David Lee, has given invaluable help in the preparation of this paper, as well as in earlier stages of the work, and is responsible for the pen work in Figures 40b and 41.

HISTORICAL.

The generic name *Swainsona* dates from the publication of *S. coronillifolia* by Salisbury in 1806, though this same species had previously been recognised as *Vicia galegifolia.* Subsequently, several other specific names were published during the first half of the nineteenth century for plants grown from seed sent home by early Australian collectors. Unfortunately, some confusion resulted from this work because of the horticultural interests of the workers of this period. This is reflected in the fact that several plants, differing essentially in flower colour only were given different specific or varietal names. *Swainsona galegifolia* (previously placed in the genera *Vicia* and *Colutea* as *V. galegifolia* and *C. galegifolia*), *S. coronillifolia,* its varieties *albiflora* and *alba, S. Osbornii* and its variety *atropurpurea,* are all names referring to *S. galegifolia;* while *Cyclogyne swainsonioides, S. oncinotropis* and *S. procumbens* var. *minor* were all applied to *S. swainsonioides.*

With the arrival of Ferdinand von Mueller in Australia in 1847, and with the extension of exploration over the continent, many more species of *Swainsona* were discovered. Mueller himself contributed many names to the taxonomy of the genus, though a number of them were left to Bentham for publication. In his "Flora Australiensis" Bentham (1864) published the first comprehensive key to the genus, together with descriptions or redescriptions of 22 species.

After the publication of the "Flora Australiensis," many more species were described, chiefly by Mueller in the latter part of the nineteenth century, and by J. M. Black during the present century. In all, an additional 30 species as well as some infraspecific groups (as accepted herein) have been described, but an approximately equal number of other specific or varietal names have been published which are here given in synonymy or in lower rank. The work of J. M. Black, whose excellent studies of the South Australian species drew attention to new and valuable diagnostic criteria, has been of great assistance in this investigation.

DISTRIBUTION.

Swainsona is essentially a genus of inland areas where rainfall is low. A very large percentage of the total number of species occurs in the interior of the continent within the 20″ isohyet and even in the 10″ rainfall zone. In the eastern States they are found mostly on the plains west of the Great Dividing Range, but a few are commonly to be found on the highlands, and one or two approach the coast near Rockhampton, Queensland, an area in which a number of inland species are to be found. The only species which is extensively coastal in distribution occurs along the eastern part of the southern coast, from Kangaroo Island to Wilson's Promontory and in Tasmania. Even here many of the stations are poorly watered areas and nearly all fall within the 30″ isohyet. In Western Australia there are a number of coastal or subcoastal collections, but the localities given are often approximations and probably represent stations bordering on or in the dry areas (rainfall under 20″ or under 10″) which come close to the coast in the North-West Division of that State. Similarly, collections from along the route of the Transcontinental Railway in South Australia, although close to the coast, are nevertheless from a very arid belt.

Swainsona is virtually absent from the extreme corner of the South-Western Division of Western Australia, where the rainfall exceeds 30″; it does not appear to be a part of the peculiar endemic flora of this region.

In the Northern Territory, records of *Swainsona* come chiefly from the drier southern parts (under 10″ rainfall) and there are very few from north of the 20″ isohyet.

Although much of its territory comprises plains of low altitude, the genus is well represented in the Macdonnell and Musgrave Ranges (to about 5,000 ft.), while a few species are commonly found in the highlands of New South Wales (5,000-7,000 ft.) and to a lesser extent of Victoria (about 5,000-6,000 ft.).

The wide expanse between the 120° and 130° lines of longitude is singularly unrepresented by collections, except around the margins of the continent, but a few specimens from the interior of this region suggest that it is not so much barren of *Swainsona* as insufficiently collected.

The distribution maps in the text show the rather strikingly local distribution of some of the species, or of variants within them. A few other species are very widespread, occurring in every State. It is likely, as can be seen from the density and extent of the collections to date, that many of these maps present a reasonably accurate picture of the range of the species, but no great reliance can be placed on the concentrations which they indicate. A great many of the specimens, at the Sydney Herbarium at least, have accumulated as the result of enquiries from the rural community regarding the plants forwarded. Because of the toxicity of some of the species and their occurrence in sheep country, specimens from rural sheep centres tend to outnumber those from other areas where the plants may be equally abundant. The highlands and western slopes of New South Wales were, however, collected over fairly thoroughly in the early decades of the present century, when professional collectors were employed. The effect of concentrated collecting in certain localities is further offset by the fact that duplicate localities are not shown on the more crowded maps.

ECONOMIC.

The chief economic importance of *Swainsona* concerns the toxicity of certain species to stock. Owing to the confused state of the nomenclature in New South Wales, where many of the records of stock poisoning originate, it is very often difficult to be sure that the names of the suspected species have been correctly applied.

There is little doubt, however, that *S. galegifolia,* inclusive of the form known as *S. coronillifolia* and variously named white-flowered forms, and *S. Greyana,* including *S. Cadelli,* are harmful to stock, causing them to become "pea-struck." This is a condition involving degeneration of the nerve fibres, and is ultimately fatal if the animal continues to have access to the plant.

The poisonous principle appears to be cumulative in its action as the symptoms may not appear for several weeks after feeding on the plant has begun. The animals' vision is apparently affected as they jump over small twigs whose size seems to be exaggerated; they become stiff and unsteady, fall and may be unable to rise, and their teeth often become loose and displaced or dislodged.

S. procumbens is another species whose poisonous properties are well authenticated, as are those of *S. luteola.* On the other hand, a few species have been stated by observers to be good fodder plants—for example, *S. stipularis* var. *stipularis* at Mount Lyndhurst, S.A. (*fide* Max Koch).

TAXONOMY AND NOMENCLATURE.

The Diagnostic Characters.

Technique.

Because of the importance of the floral characters, dissection of the flowers was necessary in the great majority of specimens, either for determination or for the compilation of measurements given in the descriptions. A solution with the formula:

Water	325 mls.
95% alcohol	100 mls.
Glycerine	75 mls.

was used for soaking out dried flowers and all measurements of floral parts have been made from such soaked and mounted material; 15-25 minutes soaking gave satisfactory pliancy to most flowers, but immersion for 24 hours did not prove harmful. It should be noted that the method of mounting dissected flowers used by Black has yielded slightly more expanded petals, and thus slightly greater dimensions are given by him in descriptions of some of the same specimens as are described below.

By mounting the dissected petals on a small card and enclosing this in a packet gummed to the herbarium sheet, the dissected flower was available for repeated microscopic examination. In this way, borrowed specimens bearing only a few flowers could be subjected to the necessary examination without actually depriving them of fragments, and the necessity for future workers to destroy further flowers in dissection is thus eliminated.

Floral Characters.

The Flower.

Colour. The flowers of a species may vary through several shades (including white) of any particular colour, and the colour cannot be regarded as a reliable specific distinction as it was by the earlier authors. However, a species which has purple flowers, the common colour in the genus, may have (in different individuals) dark-red, violet, blue or paler mauve or pinkish flowers, but will not usually produce also yellow or brownish flowers. *S. luteola* is a doubtful exception in this respect, while purple and brownish-flowered varieties are found in *S. stipularis,* and *S. microphylla* contains both purple-flowered and a yellow-flowered subspecies. In a few species the colour seems to be constant, *e.g.,* brilliant rose pink in *S. tephrotricha,* magenta in *S. Murrayana,* yellow in *S. laxa* and *S. rigida.*

Size is similarly an indicative, though not critically diagnostic character, since it seems likely that it reflects the favourableness of the season to some extent in the drier areas. On the other hand, a consistent flower-size is often exhibited by a species in one locality (e.g., *S. stipularis* around Broken Hill), while its flowers in distant parts of the range may be noticeably smaller or larger, suggesting a genetical basis for the flower size.

Calyx.

Although given considerable prominence as a diagnostic character in the past, the variation in details of the calyx make it only an indicative character in most species. The calyx in the genus as a whole follows a fairly uniform pattern, being more or less campanulate with five nearly equal teeth, and a pair of larger or smaller bracteoles attached at about the junction of calyx and pedicel.

Teeth. Relative lengths of calyx teeth and tube seem to be more or less constant in some species (e.g., *S. laxa* and *S. rigida,* though this may be due to paucity of material), but highly variable in others such as *S. Forrestii* and *S. galegifolia.* Where there is variation in calyx size, it is nearly always in the teeth, which may be longer or shorter relative to a nearly constant tube length in otherwise identical specimens.

Hairs. Colour of hairs on the calyx is often misleading because of changes during maturation of the inflorescence, besides an inherent variation within most groups.

Standard.

Size. Apart from its size, which is correlated with flower size, the standard is important diagnostically because of the presence and nature of calli (callosities) or their absence, in the region of its claw.

Calli. In a few species, such as the Genotype, *S. galegifolia,* the calli are very distinctive structures usually described as plate-like; in other species various modifications of the tissue of the claw or lamina of the standard occur in apparent simulation of calli, but these are sometimes less constant in form and occurrence. Fine longitudinal ridges or folds in the claw, diverging and disappearing in the lamina, are regarded as modifications of calli, while another variation takes the form of a pair of almost punctate thickenings or conical convexities just above the claw, occasionally elongating into ridge-like thickenings or being so poorly developed as to be scarcely discernible.

Shape. The standard shape is fairly uniform throughout the genus, but in a few groups the claw may be typically shorter and broader than usual, expanding gradually into the lamina (e.g., *S. plagiotropis*), or the lamina may be markedly narrower than long (e.g., *S. Murrayana* ssp. *Murrayana*) or expanded (e.g., *S. swainsonioides*).

Wings.

Wings are not often distinctive in shape and vary to some extent in length. The minute wings of *S. luteola* and *S. Oliveri* and the long, broad wings of *S. stipularis* var. *longialata* are, however, distinctive.

Auricles. A few of the less well known species seem to have constantly ciliate or hairy auricles on the wings, but in other species this is found to be an inconsistent feature and cannot be regarded as a diagnostic character of much value.

Ovary.

Gynophore. The extreme forms in the genus are the stipitate and the subsessile ovaries, the former being provided with a distinct, slender gynophore which usually elongates considerably in the fruit, as in *S. galegifolia* and *S. colutoides* (Fig. 1), the latter being seated on a short and relatively stout gynophore which does not elongate noticeably after fertilisation, as in *S. campestris, S. procumbens, S. Oliveri* (Fig. 47d), and many others. Sometimes, however, the slender type of gynophore is scarcely longer at anthesis than the stout type, as in *S. laxa*; in other species such as those of the *Macculochiana* Group, though the gynophore is slender and distinct at anthesis, it may elongate but little after fertilisation.

Pubescence of the ovary seems to be constant within many species, but is unreliable in that a few species, of which large collections have been made, show some specimens with glabrous and others with distinctly hairy ovaries. *S. luteola* and *S. campylantha* are examples of this condition. In *S. occidentalis, S. monticola* and some others, the pubescence of the ovary is constantly localised in small areas of the surface. In other species the suture-line only may be hairy, or the hairs may occur in a broad band centred along that line, while in others the suture-line hairs may be of a different colour or more spreading than those on the rest of the ovary.

Style.

The nature of the style and particularly of its tip, provides a most important diagnostic character. Although the distinctions are sometimes difficult to describe, familiarity with the forms of the style makes it a very valuable clue to identification since, within a small range of variation in each type of style tip, it is constant for the species.

The style itself assumes only a few different forms in the genus, the slender style of *S. phacoides* contrasting with the flattened style of *S. stipularis* and *S. Murrayana,* while features of length and curvature may be recognised when familiarity is gained.

Style-tip. The apex of the style assumes a number of forms, being straight or bent inwards, or less commonly, outwards, from the rest of the style. The only exceptions to the rule of constancy of style tip are *S. stipularis* and *S. microphylla*, though in a few other species, ageing of the flower may relax the flexed apex of the style, causing it to become straight or bent outwards, instead of inwards.

Beard. Characteristic of the genus is the beard of hairs on the upper or adaxial (ventral) side of the style, though it seems to be almost if not quite absent in *S. Oliveri.* While the beard is long, dense and extensive in some groups, and shorter, sparser and more limited in extent in others, the age of the flower and conditions of preservation often reduce the beard and make it of only general value as a distinguishing character. The peculiar condition in *S. plagiotropis* in which the beard is described as in the abaxial (dorsal) position may be due to a twisting of the style through 180°, and not to any structural difference, though this is not satisfactorily established.

Hairs behind the stigma. Another feature distinguishing the style of a number of species is a group of hairs behind the stigma distinct from the normal beard. This forms a tuft when the hairs occur in a bunch, or a line, or a more or less oblique ring according to their distribution on the style. In a few species the presence or absence of these hairs is rather indeterminate, due either to their poor development, or to their easy removal by friction during the drying process, e.g., *S. Murrayana* in which the tuft is only rarely seen, and *S. ecallosa* in which the tuft is probably always developed but requires a critical examination to see. The arrangement of these hairs, in combination with the style tips makes easy the separation of such similar species as *S. Burkei* (without a tuft) and *S. flavicarinata* (tufted).

Fruit.

Except in a few highly variable groups, the fruit is specifically constant, and in a few species such as *S. cyclocarpa* and *S. occidentalis* is sufficient for identification without other parts of the plant. There are three main fruit types:

(1) The inflated pod seen in *S. galegifolia, S. colutoides* and others, in which the suture is not intruded into the loculus, and which is usually distinctly stipitate.

(2) The cylindrical to oblong pod which obtains in the majority of species, having the suture more or less deeply intruded and often dividing the loculus into two, as in *S. swainsonioides* and *S. occidentalis.* This type is nearly always subsessile, but a few species have a distinct though short, slender stipes, e.g., *S. Forrestii* and *S. occidentalis.*

(3) The turgid, subsessile, firm-walled pod without intrusion of suture, seen in *S. lessertiifolia,* and *S. microphylla.* The fruit retains the pubescence of the ovary, if any, the hairs remaining the same size, so that enlargement after fertilisation may produce a sparsely downy or hoary fruit from a pubescent ovary.

VEGETATIVE CHARACTERS.

Pubescence.

The nature of the pubescence, and of the individual hairs comprising it, is a most important diagnostic character. The presence or absence of pubescence is also important, but degrees of pubescence vary so widely in many species as to make this character of little value. J. M. Black was the first to distinguish basitrichous from meditrichous species, and though the distinction is not complete, it is still a most useful one.

Familiarity with the different forms assumed by the pubescence in the genus often makes it possible to determine to which of a small number of species a vegetative specimen belongs, even in a genus where floral characters are so extremely important diagnostically.

Distinctions between definitely meditrichous species like *S. tephrotricha,* and definitely basitrichous species such as *S. Forrestii* or *S. villosa* are simple, but other conditions exist in which the hairs are attached close to one end, and it is difficult to maintain the distinction drawn by Black between blunt and pointed ends. *S. oligophylla* is a species in which the hairs are very often asymmetrically attached, but the point of attachment being very close to the end and the hair long, the condition is easily mistaken for basitrichy. In other species such as *S. oroboides* ssp. *sericea,* hairs which are attached laterally, but right at the end, are mixed with others attached farther from the end or even quite close to the middle. Again in *S. phacoides,* though the hairs are definitely pointed at both ends and usually attached well away from them, the peduncles often have a pubescence of basifixed hairs.

The form of the hairs is sometimes a distiguishing feature. In many species they are of almost uniform type and thus not significant, but the white, rather stiff-looking, straight "quill-like" hairs of *S. fissimontana* are soon recognised, and distinguished from the silky, almost colourless, flattened hairs of *S. stipularis* and related species. Similarly *S. swainsonioides* and *S. procumbens,* with rather similar flowers and vegetative parts can be easily separated on the character of their hairs.

Other types of hair result in a form of pubescence which is often recognisable when familiarity is gained. Thus numerous stiff-spreading, basifixed hairs result in the fuzzy or minutely bristly pubescence of *S. microphylla* ssp. *tomentosa,* while the basifixed curved-spreading hairs of *S. oroboides* ssp. *hirsuta* give a loosely adpressed pubescence which on the upper surface of the leaflets is typically directed from the margins diagonally to the midrib. The woolly pubescence of *S. Greyana* is made up of long, basifixed crinkly hairs.

Apart from the pubescence, the vegetative features show so much general uniformity within the genus that few critically diagnostic characters are provided.

Stipules.

Stipules vary from subulate to broad leafy structures, and are distinctive in only a few species. Toothed stipules seem to be constant when they occur, except in *S. stipularis,* though the degree of incision varies greatly.

Inflorescence.

This varies a little in its slender or stout peduncle, and in the number and spacing of the flowers comprising it. In one species, *S. fissimontana,* the glabrous peduncle is a useful distinguishing character, since all the related species have hairs on the peduncle.

Habit.

Most of the species are prostrate or decumbent plants, though the degree of prostration varies considerably. Thus *S. luteola* is one of the more prostrate species, while *S. recta* tends to grow rather stiffly erect, *S. Greyana* and *S. galegifolia* are loosely erect shrub-like herbs, and *S. Maccullochiana* and *S. decurrens* are exceptional in that they assume, according to descriptions, a tree-like habit with a single, erect stem at the base. The inflorescence in all species tends to be upright even when the stems are completely prostrate.

Size.

Size of the plants varies a great deal, apparently in relation to the season which is particularly important in the arid areas, though some species such as *S. Oliveri* are always small (the stems about 15 cm. long) while others like *S. galegifolia* and *S. Greyana* always attain a shrubby habit when fully grown.

Leaves.

When the range of variation within a species is fully known, the leaves can be regarded as a reasonably good diagnostic character for the species as a whole, though distinctions may fail in a number of individual specimens. The number of constituent leaflets is their most important feature and is constant within a few pairs, but in young plants or in suckers, the number, size and shape of the leaflets is atypical. They are fewer, often reduced to 5, 3 or 1, and usually shorter, broader and more obtuse than in the older leaves.

Leaflets.

Leaflets are commonly obtuse or more or less retuse, but a few species have constantly acute leaflets on the mature leaves, e.g., *S. fissimontana, S. Incei* and *S. campylantha.* The peculiar gland between the lobes of the leaflet in *S. microcalyx* ssp. *adenophylla* is a distinguishing feature, but imperfect gland-like structures also occur in the similar *S. microcalyx* ssp. *microcalyx.*

Distribution of the pubescence on both, or one side only, of the leaflets is a helpful diagnostic feature, though in a few cases it is impossible to draw an absolute line between groups on this character.

SOURCE OF THE SPECIFIC DESCRIPTIONS.

The specific descriptions have been drawn up from varying numbers of specimens. Where large collections were available, representative specimens were selected for measurement and description. Where less material was to hand, all the specimens were used in the compilation of the description.

Any Type specimens available for examination were, for most species, among those measured and described. Where there was any notable variation, the details of the Type specimen have been indicated, but no distinction has been made if all the specimens conformed closely to the Type.

In the case of a very few species whose delimitation has presented no special difficulty, the Type specimens were examined in the Melbourne Herbarium and compared with specimens which were taken from the Sydney collection for that purpose. This served to confirm or correct the application of specific names and was carried out before any detailed descriptions had been written. In these few descriptions, therefore, the Type specimen has not been used except in the indirect manner indicated. The species involved are *S. Burkittii*, *S. coluloides*, *S. procumbens*, and *S. unifoliolata*.

TYPIFICATION.

The implications of Sect. 2 of the International Rules of Botanical Nomenclature, The Type Method, have been strictly applied in this work. While there is considerable agreement on the nomenclature of the commonly used Types and their definition, there are still some differences in the use of names of some important duplicate types. Frizzel (1933), Furtado (1937) and Davis and Lee (1944) have all published lists of names applied to Type specimens in attempts to standardise their use and make their meaning more precise. Unfortunately none of these articles covers satisfactorily every requirement felt in this revision. All the terms except two, however, are embodied in Furtado's paper (*loc. cit.*) and have been used in the sense defined by him.

The exceptions are Homoeotype and Genotype, which occur in the other two lists and are used in their sense (see Definitions, pp. 144-5). In particular, the adoption of the term Haptotype for a particular sort of Paratype, should be noted. It is considered that several specimens collected in the one locality by the same collector on the same day have a greater significance than an ordinary Paratype. If there is any doubt as to the Type-plant origin of these duplicate specimens, they are designated Haptotype rather than Isotype. Future workers are thus informed of the possibility of variation from the Type not observed by the collector.

Although some distinctions may savour of the pedantic, experience with collections in which specimens have been mixed and eventually found to have been separated from their labels has shown that the utmost precision is necessary in the matter of duplicate Types.

Lectotypes have been designated in species whose descriptions were originally drawn up from a series of Syntypes. Many of these species were published by Bentham who examined material forwarded from Australia by Mueller. A great deal of this material was returned to the Melbourne Herbarium and every sheet examined by Bentham was marked accordingly. These portions of specimens or, sometimes at least, whole specimens at Melbourne, are Syntypes of Bentham's species no less than the parts retained by him at Kew. They have been here designated Lectotypes because they have been available for examination during the present work and thus guarantee the application of a number of names in this revision.

Several other factors have had to be considered in the selection of Lectotypes. As Bentham arranged his citations according to the States from which the specimens were derived, there seems no reason for adopting the first citation as the Lectotype. In such cases, providing all Syntypes are conspecific, the best-preserved and most representative specimen available has been designated. In a few cases, although a Holotype or Lectotype is extant, its fragmentary condition made it of little value and suggested no great permanence; a Homoeotype has, therefore, been named to function in its stead when required, and to guide the choice of Neotype when such should become necessary.

Apart from these general practices, notes on the typification of a few individual species will be found in the text.

STRUCTURE OF THE GENUS.

The satisfactory grouping of related specimens into the categories provided by traditional taxonomy has been one of the more difficult aspects of this revision, and the difficulty is inherent in the absence of large, more or less uniform discontinuities between many of the elements comprising the genus.

It is noteworthy that, within *Swainsona* in Australia, phenotypes fall commonly into small groups of related "species," elements so closely connected that it is sometimes difficult to decide whether they qualify for specific rank or whether they are being observed, at our time level, in some evolutionary process leading to or following on the attainment of that rank. Thus some series seem to have the characters of the *Artenkreis* of Rensch (1929), e.g., the series *S. recta, S. monticola* and *S. parviflora,* the series *S. Oliveri* and *S. luteola* and the series *S. colutoides* and *S. galegifolia,* while if *S. Greyana* were added to the last pair, the group would correspond with the *Superspecies* as defined by Huxley (1942). Others can be interpreted as examples of the *Rassenkreis* of Rensch, e.g., *S. oroboides* and *S. microphylla.*

S. Greyana, another polytypic species, might be interpreted on the other hand as the result of hybridisation between species, the terminals of the variation, showing a graduated series brought about by recombination. Yet another series in Western Australia, here included in three species, *S. Forrestii, S. ecallosa* and *S. Maccullochiana,* consists of three discrete groups differing only in size, chiefly of the flower and fruit, and suggests the possibility of polyploidy or simple quantitative genetic differences.

One of the most difficult series, including most of the meditrichous species, comprises a number of constant phenotypes readily distinguished from one another though all of a similar pattern, together with other phenotypes, also constant and distinguishable, but combining the characters of two or more of the first groups, a situation suggestive of reticulate speciation (Turrill 1936). *S. stipularis* var. *stipularis* and *S. fissimontana* might be taken as examples of the first group, while in *S. stipularis* var. *purpurea, S. stipularis* var. *longialata* and *S. microcalyx,* their various attributes are combined in different ways.

In attempting to reveal such conditions in classifications of the constituent groups, the limitations of orthodox taxonomy soon become evident, and in particular the need is felt for categories below the rank of species indicative of kinds, rather than of degrees, of difference.

The present-day tendency of taxonomy to synthesise its findings with those of other branches of biology leads to the recognition of species as, essentially, natural populations separated from similar populations by some form of reproductive isolation. Mayr (1942, p. 120), Dobzhansky (1941, p. 373), Timofeef-Ressovsky (1940, p. 91-2), Davis (1941, p. 50), and others have variously modified this definition. These populations, in the course of evolution, exhibit various degrees of stability and change due to the particular conditions obtaining in them up to the time of their collection. But while a population continues to be integrated by a physical interchange between its component elements, however manifestly different these may be, it is, in the biological sense, a species. If its component elements, by virtue of physiological, morphological or other distinctions, require nomenclatural recognition, some category below the species level is appropriate.

In the past many morphologically continuous series of plants have been broken up arbitrarily under a series of two or more specific names, leaving many of the intermediate specimens with identifications which varied according to the worker responsible. This is distinctly unsatisfactory at the specific level, but in lower categories, in which the possibility of incomplete discontinuity is implied, it is of less consequence. With the recognition of differences in the distribution of variants within the species—some regional, others distributed more or less at random through the specific range—and the significance of this in relation to the evolutionary process [e.g., Dobzhansky (1941 especially Ch. 11), Mayr (1942 especially Chs. 3-5), Timofeef-Ressovsky (1940)] it is advantageous to recognise the regional variants—the potential incipient species—in a different and higher category than that in which the variant is placed whose morphological distinction is not correlated with a distinct geographical range.

Therefore, in this revision, infraspecific variants which occupy a definite part of the specific range, or which show a recognisable tendency to do so, are classified in subspecific rank. Variants of sometimes comparable morphological distinction which appear to be distributed at random through the range of the species are classified as varieties.

There are a number of species in *Swainsona* where single-character variations such as flower colour, would, if formally named, require a lower rank than either the subspecies or variety. Such variants have been left unnamed simply on the grounds of convenience, it being held that the value of such nomenclature is liable to be outweighed by its complexity.

NOMENCLATURE OF THE POLYTYPIC SPECIES.

Present usage permits the use of the binomial to denote either the sum of the infraspecific populations, or only that part of the specific population in complete agreement with the Type, to which the other infraspecific elements are appended. The latter view seems to the writer to depend upon implications in the International Rules of Botanical Nomenclature which were probably not intentional, and to be divorced from the actual conditions in nature.

In this paper, therefore, the species is regarded as composed of one or more monotypic elements, and the simple or composite species, as the case may be, is implied throughout this text by the use of the binomial.

Since the International Rules state (Art. 18) " . . . the type . . . . of the name of a species . . . . is usually a specimen . . . .," a specimen has been cited in the text as the Type of a specific name, even when the species is polytypic.

The Type specimen of the species is also, by virtue of its significance in the species, the Type of that subdivision of the polytypic species into which it falls. This group is given an epithet in the appropriate rank, which is the same as the specific epithet, following the proposal of Sprague (1939) awaiting decision at the next International Congress. The suggestions in Rec. xviii of the current International Rules are not followed because of the anomalies which could result (Furtado, 1937A, p. 243).

RELATIONS WITH OTHER GENERA.

Swainsona is one of a group of Leguminosae whose generic separation is perhaps more arbitrary than most. A critical investigation of the group would involve a thorough knowledge of the genera *Lessertia, Colutea, Clianthus* and *Sutherlandia.*

From a very superficial acquaintance with these genera, it seems that the three last are small groups, quite readily distinguished—*Colutea* by the peculiar position of the stigma in the angle of the hooked style tip; *Clianthus* by its long-acute petals; *Sutherlandia* by its long keel and reflexed standard-edges, with a membranous, inflated fruit.

On the other hand, *Lessertia* and *Swainsona* seem to be distinguished from one another as much on a geographical as on a morphological basis. In *Lessertia,* a South African genus, there is typically a tuft behind the terminal stigma, the style is with or without a longitudinal beard, while the fruit is thin-walled and flattened, or if inflated, the suture is not intruded. *Swainsona* as at present recognised, contains species very similar to *Lessertia,* exhibiting the tuft, the longitudinal beard and an inflated fruit (*S. laxa, S. rigida,* and *S. brachycarpa*) but in these species the pericarp becomes coriaceous with age. *S. colutoides* has indeed all the features of a *Lessertia*—the beard, the tuft, the inflated membranous pericarp. Its resemblance to *S. galegifolia,* however, is so striking, and its distribution so obviously relates it to *Swainsona* that the species is retained in its present position. In other species one or more of these characters differs from the condition in *Lessertia,* and in the majority of species, though not the Genotype, *Swainsona* shows a cylindrical fruit with a more or less deeply intruded suture, the whole straight or curved. The two genera may represent parallel developments from similar ancestors. The comparison may be extended to the similar number of species recorded in each genus—about 52 in *Swainsona* and about 60 in *Lessertia,* and perhaps also to the infraspecific variation and-intermediate condition of several of the species (*fide* Harvey, 1861-62).

Although *Swainsona,* as at present constituted, is a fairly cumbersome genus with much variation in its basic floral pattern, it does not lend itself to generic subdivision any more readily than the group of genera enumerated above. Several characters are available for diagnosis, but a classification of species on the basis of any one of these characters is found to bring together species contrasting in a number of other features equally useful for diagnosis. Consequently the genus is maintained here in its accepted circumscription.

DEFINITIONS OF TERMS USED IN THE SPECIFIC DESCRIPTIONS.

In the specific descriptions it has been necessary to use a number of terms which lack precise or universally accepted definition, and in order to avoid vagueness the terms have been used only in the sense defined below:—

Leaflets, shape: described according to the following definitions:—

Oblong, series (1): sides parallel, greatest width maintained from base to apex.

Elliptical, series (2): greatest width at the middle, tapering evenly to both ends.

Lanceolate, series (3): greatest width at one-third from the base, tapering evenly to both ends.

Length : Breadth Ratio.	Descriptive Terms.		
	Series (1).	Series (2).	Series (3).
12 or more : 1	Linear	....	....
6 : 1	Cultrate	Very narrow-elliptical	Narrow-lanceolate.
3 : 1	Narrow-oblong	Narrow-elliptical	Lanceolate.
2 : 1	Oblong	Elliptical	Narrow-ovate.
3 : 2	Broad-oblong	Broad-elliptical	Ovate.
6 : 5	Very broad-oblong	Rotund	Broad-ovate.
6 : 6	....	Orbicular	Very broad-ovate.
3 : 4	....	Oblate	.... (In this series the prefix *ob* is used when the greatest width is one-third from the apex.)

Raceme, length: includes the lower part of the peduncle bare of flowers.

Suture: in this paper "the suture" means the ventral, adaxial suture which is on the top of the more or less horizontal ovary.

Sympatric: term used by Mayr (1942), for groups coexisting in the same locality.

Synonyms, absolute: those based on the same Type.

equivalent: those based on different Types.

Types (see pp. 140-41):

Genotype: the single species upon which a genus is based.

Haptotype: a specimen purported to have been collected simultaneously with the Type and bearing the same collection number (*if any*)*, but not certainly from the Type plant.

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* Words in italics have been added by me.

Holotype: The specimen chosen by the author and cited in his original description as that by which the species *or other group** must be interpreted. (Holotype, by monotypy, means that a single specimen was cited by the author with his original description, though it was not specifically designated Holotype.)

Homoeotype: a specimen compared by a competent observer with the Holotype, Lectotype or other primary Type of a species *and declared closely similar.**

Isotype: a specimen collected from the same plant as the Type, at the same time, and bearing the same collection number (*if any*).*

Lectoparatype: a Syntype not chosen for the Lectotype.

Lectotype: a Syntype selected as *the equivalent of** a Holotype.

Neotype: a specimen agreeing with the original description of a species *or other group** and selected as the Type when no material from the Proterotype collection exists.

Paratype: any primary Type (*sensu Furtado*)* other than the Holotype.

Syntype: any primary Type, if no Holotype has been chosen.

CONVENTIONS USED IN THE CITATION OF SPECIMENS.

Except in the case of a few which are annotated "not seen," every specimen cited has been examined by the writer. The localities within each State are cited in a roughly North to South order. If several specimens from one Herbarium are cited consecutively, the name of the Herbarium is given only after the last of the series.

When a collector's name appears in brackets, it has been inferred from information at the disposal of the writer, but is not actually written on the label of the specimen cited.

Italicised numbers following date of collection are registration numbers of the appropriate Herbarium.

LOCATION OF SPECIMENS.

The location of the various specimens cited is indicated according to the code of abbreviations proposed by Lanjouw (1939) for international use, namely:—

AD—Herbarium of the Dept. of Botany, University of Adelaide, S.A.
ADW—Herbarium of the Waite Agricultural Research Institute, S.A.
BRI—Queensland Botanical Museum and Herbarium, Brisbane, Q'ld.
K—Herbarium of the Royal Botanic Gardens, Kew.
MEL—National Herbarium of Victoria, Melbourne.
NSW—National Herbarium of New South Wales, Sydney.
PERTH—Herbarium of the Dept. of Agriculture, Perth, W.A.
SYD—Ray Herbarium of the Dept. of Botany, University of Sydney, N.S.W.
US—United States National Herbarium, Washington, U.S.A. and also the following:—
JBC—Herbarium of Dr. J. B. Cleland, Adelaide, S.A.
JMB—Herbarium of Mr. J. M. Black, Adelaide, S.A.
STB—Herbarium of Mr. S. T. Blake, Brisbane, Q'ld.

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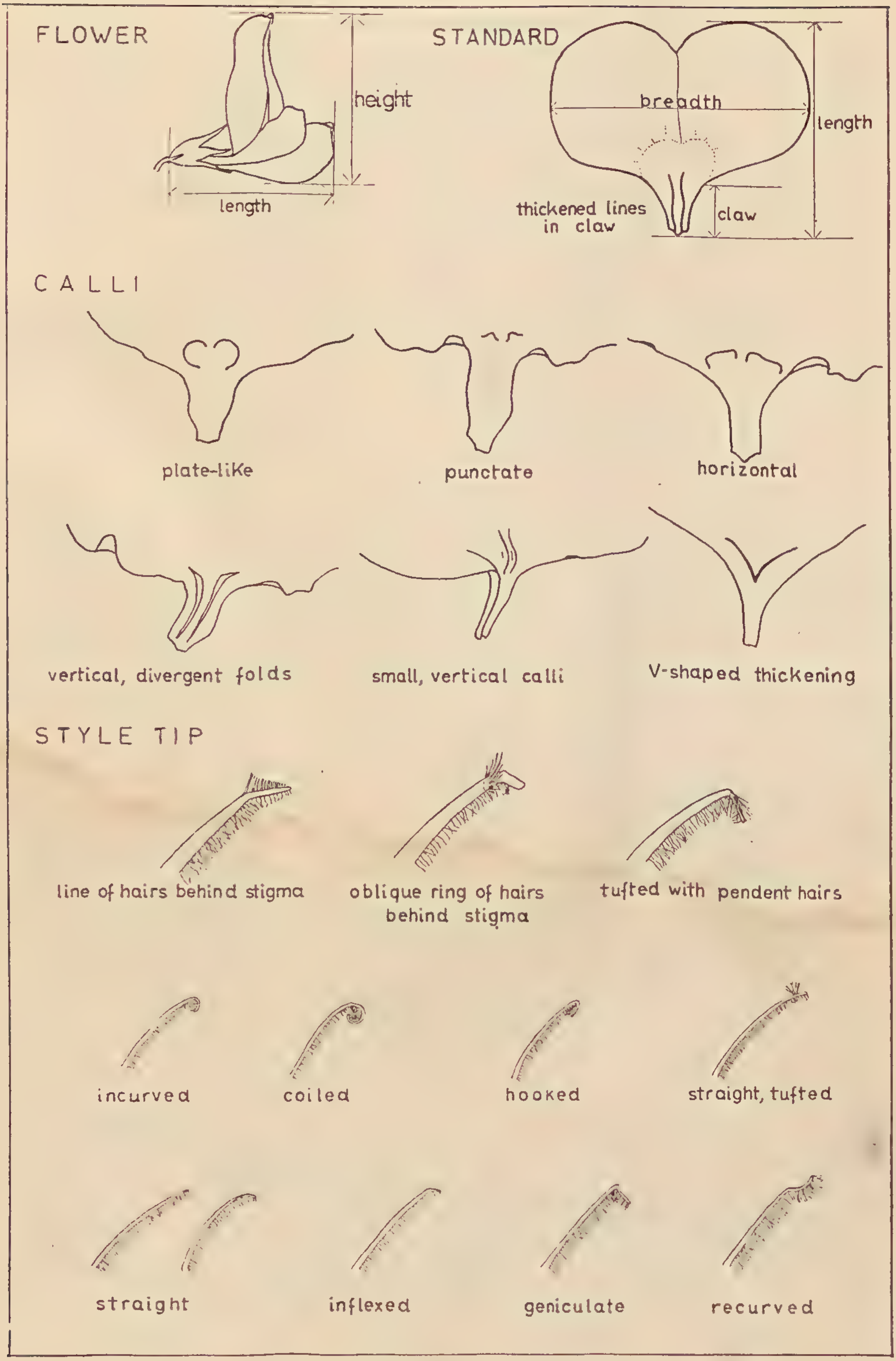
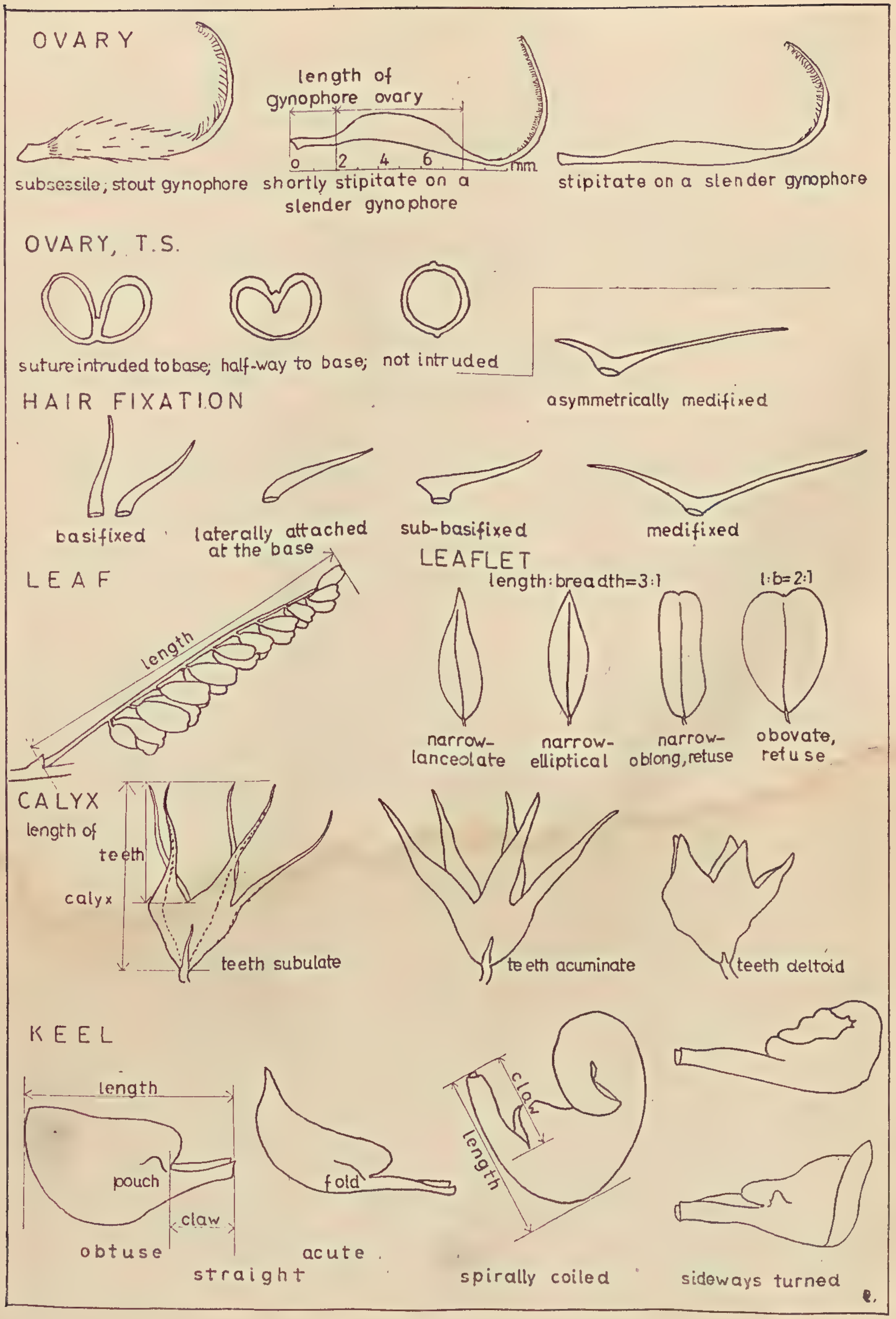
* Words in italics have been added by me.



Diagrams explanatory of descriptive terms.



Diagrams explanatory of descriptive terms.

ABBREVIATIONS.

Abbreviations of periodicals are those used in A World List of Scientific Periodicals, London, 1927.

In addition, the following abbreviations have been used:—

S.D.E.—Simpson Desert Expedition.
E.E.E.—Elder Exploring Expedition.
V.E.E.—Victorian Exploring Expedition.
G.V.R.S.—Veterinary Research Station, Glenfield, N.S.W.
N.E.U.C.—New England University College, Armidale, N.S.W.

SYSTEMATIC TREATMENT.

SWAINSONA Salisb., Parad. London. t. 28, 1806.

GENOTYPE, by monotypy: *S. coronillifolia* Salisb., loc. cit., equivalent synonym for *S. galegifolia.*

Although a separate generic description was not given by Salisbury, the generic name is considered to have been validly published because of the technical monotypy of the genus when *S. coronillifolia* was described. Salisbury mentioned (loc. cit.) "another species of this . . . . genus" as *Colutea galegifolia,* and as *Vicia galegifolia,* but did not use the actual combination *Swainsona galegifolia* which was not published until 1812.

SYNONYMS: *Cyclogyne* Benth. apud Lindl., Edward's Bot. Regist., Appendix: 16, 1839. *Genotype*: *C. canescens* Benth. apud Lindl., loc. cit., syn. for *S. canescens. Diplolobium* F. Muell., Trans. Bot. Soc. Edin. **7**: 489, 1863. *Genotype*: *D. Walcottii* F. Muell., loc. cit., syn. for *S. occidentalis.*

A genus of herbaceous, sometimes shrub-like, plants, mostly decumbent or procumbent in habit with several stems, or occasionally erect with a single or few stems. Leaves imparipinnate, but the leaflets often irregularly placed and sometimes even in number, usually 7 or more per leaf, but fewer (1-3) in young plants or lower leaves and in one species permanently. Stipules present, entire or toothed. Inflorescence a few- to many-flowered axillary raceme on an erect peduncle, usually exceeding the leaves. Calyx with 5 nearly equal teeth, pubescent or glabrous outside, almost always pubescent inside the teeth, bracteolate at its base or the bracteoles on the pedicel. Flowers commonly purple, pinkish or bluish, sometimes brown, red or yellow, or the petals not concolorous. Standard more or less orbicular-retuse, with a patch of yellow, green or white above the claw and often with some ornamentation of the tissue in this region. Keel often upturned or incurved at the apex, straight, sideways turned or spirally coiled, obtuse, acute or somewhat beaked, often with a pair of small pockets in the tissue above the claw. Stamens (9) + 1, the free ends of the fused filaments alternately longer and shorter, anthers equal. Ovary usually multiovulate, glabrous or pubescent, subsessile to stipitate. Style bearded adaxially (in one species apparently twisted so that the beard is abaxial), upturned or following the keel shape, the tip straight or variously flexed. Stigma terminal, obscure but apparently often a minute cylindrical structure continuous with or at an angle to the style tip. Legume globular or cylindrical, straight or curved, with the upper (posterior, ventral) suture ridged or more or less deeply intruded and the walls thin- to hard-coriaceous, or inflated with the walls membranous (at least when young) and a ridged upper suture.

DISTRIBUTION: Australia, 52 species; ?New Zealand, 1 species (see *S. novae-zealandiae*, p. 260); a few species, of which neither descriptions nor specimens have been available to the writer, are recorded from the Caspian region and Southern Asia. They have been named in other genera, e.g., *Sphaerophysa,* besides *Swainsona,* and are unlikely to be congeneric with the Australian genus.

KEY TO THE GROUPS.

Because of the advantages of the "natural key," the following short key grouping related species in some proximity has been constructed. It was found, however, that a key with any pretentions to "naturalness" demanded recourse to unusually perfect material and so an alternative key which is almost wholly artificial has been provided for practical identification. This key will be found at the end of the paper (p. 260).

1. Ovary quite glabrous or rarely with a sparse woolly pubescence all over, tapered gradually into a slender gynophore elongating in the fruit; suture in the mature fruit not intruded, pericarp glabrous, smooth; fruit at least 10 mm. long, the stipes 4 mm. long or longer.

2. Style tip incurved to coiled with a tuft of long hairs behind the stigma; standard without calli .... 5. *S. Fraseri.*

2.* Style tip straight or slightly inflexed; if tufted behind the stigma, the hairs short; standard with or without plate-like calli.

3. Standard ecallose; flowers yellow or yellow except for purple wings; gynophore often only 1-1.5 mm. long at anthesis but up to 2.5 mm. ....
6-7. LAXA Group (p. 162).

3.* Standard with plate-like calli; flowers red, pink, white, bluish or purplish; gynophore 2-4 mm. long at anthesis, rarely 1 mm. only in *S. brachycarpa* ....
1-4. GALEGIFOLIA Group (p. 152).

1.* Ovary or fruit different in one or more details.

4. Ovary distinctly stipitate, the slender stipes 2-6 mm. long (or if the plant is glabrous and the ovary pubescent only along the suture, then the stipes 1-2 mm. long), elongating slightly (about 30 per cent. or more) in the fruit, densely pubescent all over or only along the suture, or quite glabrous if the stipules are very large and the leaves crowded; suture in the mature fruit intruded at least half-way to the base; keel straight; style slender, the tip straight or slightly incurved to recurved, with or without hairs behind the stigma; standard ecallose ....
8-12. MACCULLOCHIANA Group (p. 165).

4.* Ovary subsessile or on a very short gynophore 1.5 mm. long or less (to 2 mm. in *S. Beasleyana* where the flowers are large and up to 15 or 16 mm. long and the standard has horizontal calli or a V-shaped thickening), the stipes not or scarcely elongating in the fruit, or (if keel is turned sideways, plant glabrous, style tip hooked and leaflets acute) the carpel drawn out into a long stalk-like base in the fruit; suture intruded in the mature fruit except in the glabrous, subglobular to ovoid fruit of *S. microphylla.*

5. Keel spirally coiled or with a distinct sideways twist (or if straight the pubescence medifixed and the standard ecallose or with calli other than plate-like and the style tip not geniculate and without a tuft).

6. Hairs of the pubescence medifixed, or the plants glabrous.

7. Keel with a pair of distinct pouches or deep folds; leaves with 5-9 or 7-13 usually retuse or obtuse leaflets (but acute in *S. fissimontana*); style tip various; plants pubescent, rarely very sparsely. ....
27-30. STIPULARIS Group (p. 204).

7.* Keel without deep pouches; leaves with 3-9 acute leaflets; style tip hooked; plants glabrous or pubescent ...... 33-34. CAMPYLANTHA Group (p. 217).

6.* Plants pubescent, the hairs basifixed or laterally attached at the base.

8. Pericarp smooth; ovary pubescent all over; style tip straight or minutely inflexed .... 35-38. SWAINSONIOIDES Group (p. 221).

8.* Pericarp strongly reticulate; ovary glabrous except for a short band or patch of white hairs along the lower half of the suture .... 31-32. OCCIDENTALIS Group (p. 214).

5.* Keel straight or almost so; hairs of the pubescence when present basifixed (in *S. pedunculata* both basifixed and asymmetrically medifixed hairs are present), or if medifixed or asymmetrically medifixed the style tip straight and slender and the standard with plate-like calli (*S. phacoides*), or the style tip tufted (*S. tephrotricha*), or the style tip geniculate and the keel without distinct pouches (*S. oroboides* ssp. *sericea*).

9. Pubescence distinctly medifixed though the hairs of the peduncle sometimes basifixed, or in ssp. *grandiflora* all basifixed, style slender, the tip straight; standard with plate-like calli .... 14. *S. phacoides.*

9.* Pubescence absent, or the hairs mostly basifixed to subbasifixed (but see *S. phacoides* ssp. *grandiflora* under §9 above), or if all medifixed or asymmetrically medifixed the style tufted behind the stigma (*S. tephrotricha*), or the style tip geniculate (*S. oroboides* ssp. *sericea*), or the standard without plate-like calli.

10. Leaflets at maturity glabrous on both sides but sometimes with a few scattered hairs on margin and midrib; fruit where known narrow-cylindrical to broader with an intruded suture, smooth or with a ridged and hollowed surface ...... 15-18. KINGII Group (p. 177).

10.* Leaflets at maturity pubescent or hoary, sometimes sparsely, on at least the lower surface.

11. Keel acute, with crinkled hairs on the sides; leaflets 3-7 per leaf, linear to lanceolate; flowers higher (15 mm.) than long (10-12 mm.); style tip straight .... 13. *S. pedunculata.*

11.* Keel acute or obtuse, without hairs on the sides.

12. Calyx teeth subulate, the whole calyx glabrous except for a few, usually short, adpressed hairs along the veins and inside the teeth .... 20. *S. oligophylla.*

12.* Calyx teeth acuminate to short, almost glabrous to pubescent but the hairs not confined to the veins.

13. Style tip straight to inflexed with or without hairs behind the stigma, or geniculate without hairs or geniculate with short erect hairs behind the stigma.

14. Style without any hairs behind the stigma, or if tufted the hairs of the pubescence medifixed.

15. Keel with a narrow-obtuse, slightly incurved apex; flowers small, usually 6 mm. long, one to few on a capillary peduncle; fruit 5-9 mm. long, 4-6 mm. broad, the suture deeply intruded in a broad groove, the pericarp strongly reticulate with sharp ridges and hollows .... 19. *S. rostellata.*

15.* Keel obtuse or subacute but the apex not incurved, the margin almost straight; flowers often larger, 7-9 mm., 8-12 mm., or 15-16 mm. long.

16. Stipules entire; standard ecallose or with small vertical calli (see *S. phacoides* ssp. *grandiflora* with entire stipules and plate-like calli).

17. Style tip straight or inflexed or rarely, in *S. campestris*, recurved, with or without hairs behind the stigma.

18. Leaves with 13-19 leaflets, the leaflets obtuse or broadly acute, 2-9 (usually 3-7) mm. broad, 5-20 (usually 9-18) mm. long; style tip straight or minutely inflexed, without a tuft behind the stigma when the hairs of the pubescence are basifixed to asymmetrically medifixed and sparse, or tufted when

the pubescence is dense and the hairs medifixed; standard ecallose; fruit in one species at least with a ridged, not intruded, suture. 21-22. LESSERTIIFOLIA Group (p. 186).

18.* Leaves with 5-9 leaflets, the leaflets 1-2 mm. broad, 8-20 mm. long; style tip inflexed, rarely almost geniculate to recurved, without any hairs behind the stigma; standard ecallose or with small vertical calli or with slightly thickened lines in the claw, and sometimes with a few hairs on the back near the claw; keel with deep folds or pouches .... 26. *S. campestris.*

17.* Style tip geniculate, without hairs behind the stigma, hairs of the pubescence basifixed or laterally attached at the base, except in one subspecies (ssp. *sericea*) where they are asymmetrically medifixed to subbasifixed; standard with or without small vertical calli; keel with a pair of usually shallow folds .... 25. *S. oroboides.*

16.* Stipules toothed, standard with a V- or Y-shaped thickening or with horizontal calli; flowers 8-12 mm. or 15-16 mm. long ...... 23-24. BEASLEYANA Group (p. 189).

14.* Style with hairs behind the stigma, the tip straight or inflexed or minutely incurved; hairs of the pubescence basifixed or laterally attached at the base.

19. Leaflets more than three in leaves of mature plants; style with a ring of short hairs around the truncate tip or in a straight or curved line along the straight, minutely incurved or inflexed (sometimes strongly, almost geniculate in *S. parviflora* of the MONTICOLA Group) terminal segment; pericarp smooth or slightly reticulate, the suture intruded or not.

20. Ovary and fruit usually with some hairs at least near the base or along the suture; suture more or less intruded for at least some of its length, the length of the fruit distinctly greater than the diameter .... 49-51. MONTICOLA Group (p. 247).

20.* Ovary and fruit quite glabrous, the suture not usually intruded, the length not much exceeding the diameter ... 52. *S. microphylla.*

19.* Leaflets 1-3 in leaves of mature plants or if several the style with a conspicuous oblique ring or tuft of hairs behind the stigma; fruit pubescent or hoary all over, the hairs short, sparse and closely adpressed or longer and loosely adpressed, the pericarp smooth or with undulate ridges and deep hollows, the suture intruded ...... 39-42. UNIFOLIOLATA Group (p. 228).

13.* Style tip incurved to coiled without a tuft (minutely tufted only when the flowers are 4-5 mm. long and the pericarp smooth) or geniculate with a tuft of rather long hairs falling along the terminal segment.

21. Standard erect behind the other petals when flowers fully open; flowers 7-10 mm. long in conspicuous racemes longer than the leaves; pubescence usually dense, stiffly or loosely spreading .... 43-46. CANESCENS Group (p. 234).

21.* Standard more or less decumbent along the other petals; flowers small to very small, 4-8 mm. long, the larger ones (6-8 mm. long) in inconspicuous racemes shorter than the leaves; pubescence adpressed .. 47-48 LUTEOLA Group (p. 243).

DESCRIPTION OF GROUPS AND SPECIES.

THE GALEGIFOLIA GROUP.

S. colutoides, S. galegifolia, S. Greyana and *S. brachycarpa.*

The first two species of this group form an *Artenkreis,* of which the third species may also be considered a member though it is less differentiated geographically than the other two. *S. colutoides* occurs in the western half of the continent, the others in the east; it shows no apparent genetic exchange with the eastern species, but it seems possible that *S. galegifolia* and *S. Greyana* may, on rare occasions, cross—the slightly woolly-pubescent calyx of a very small percentage of the *S. galegifolia* specimens suggests this.

The fourth species, *S. brachycarpa,* is most closely related to *S. galegifolia,* differing from that species only in its weaker stems, smaller flowers and fruits and the tuft or line of hairs behind the stigma. In these two last characters *S. brachycarpa* resembles the species of the LAXA Group and might be grouped almost as well with those species.

The distribution of *S. brachycarpa* is discontinuous; the species is known chiefly from the north-east of New South Wales and coastal Queensland, but there are three collections from the Grampian Mountains, in Victoria, which appear exactly similar to the more northern specimens except for a pubescent calyx and have been included in this species.

The ecallose standard of the species of the LAXA Group distinguishes them from members of the GALEGIFOLIA Group.

The differences between the species of the GALEGIFOLIA Group are summarised in Table I.

TABLE I.

Species.	Flower.	Fruit.	Pericarp.	Floral Bracts.	Distribution.
S. colutoides ...	15–18 mm. long.	30–50 mm. long.	Membranous ...	Small—about 3 mm. long.	W.A. and S.A. west of Spencer's Gulf.
S. galegifolia ...	*ca.* 12–16 mm. long.	Often 25–40 mm. long.	More or less membranous at first, finally firm, opaque.	Small—about 2 mm. long.	N.S.W. and Queensland.
S. Greyana	15–20 mm. long.	*ca.* 30–40 mm. long.	do ...	Up to 21 mm. long; if short then broad and woolly-pubescent.	Queensland, N.S.W., Vic., and S.A. east of Spencer's Gulf.
S. brachycarpa	6–10 mm. long	15–23 mm. long.	do ...	Small, 1 mm. long or shorter.	North coast N.S.W. to central coast of Queensland, and Grampian Mts., Victoria.

1. S. colutoides F. Muell., Fragm. Phyt. Aust. 10:6, 1876.

LECTOTYPE: Between Ularing and Mt. Jackson, W.A., Young; MEL. LECTOPARATYPE: Gawler Ranges, S.A., Sullivan; MEL.

A large shrub-like herb with erect or suberect stems up to about 1 m. high, quite glabrous except for a few basifixed hairs inside the calyx teeth and occasionally around the stipules. *Leaves* mostly 8-15 cm. long with 13-23, usually 13-17, leaflets. *Leaflets* oblong or narrow-obovate, the apex truncate to retuse, often 10-20mm. long, 5-10mm. broad. *Stipules* broad, leafy, often over 1 cm. long. *Racemes* 10- more than 20 cm. long, with about 10 flowers occupying more than half of the axis. *Flowers* lilac or purple, rather large, usually 15-18 mm. long, on a pedicel 3-4 mm. in the axil of a shorter bract. *Calyx* 6-7 mm. long, the teeth 1.5-4 mm. long, usually shorter than the tube with its contracted base; bracteoles minute to 1.5 mm. long, linear, attached below the contracted base in most specimens. *Standard* with two strong, plate-like calli 15-20 mm. long, and usually a little longer than broad, the claw 3-4 mm. long. *Wings* 11-14 mm. the claw 2.5-4 mm. long. *Keel* 15-20 mm. long clearly exceeding the wings, its claw 4.5-5.5 mm. without any pouches or folds. *Ovary* (Fig. 1) at anthesis 6-9 mm. on a slender gynophore 3-4 mm. long. *Style* tip (Fig. 1) straight or minutely inflexed with a small tuft of hairs behind the stigma. *Fruit* much inflated with thin walls, the suture not intruded, roughly elliptical or lunate in outline, 3-5 cm. long, the stipes about 5 mm. long.

DISTRIBUTION: See Map 1, derived from the Types and the following specimens.

South Australia: Ooldea, S.A.White, 6.1917; JMB. 408 miles from Port Augusta, Saunders, 3.1917, *310*; Port Augusta, Saunders, 5.1917, *309*; NSW.

Western Australia: Victoria Desert, E.E.E. Camp 54, Helms, 17.9.1891 (*bis*, dups. MEL.; NSW. *308*); AD. Yilgarn near Mt. Moore, King and Lefroy, 1889; Near Lake Deborah, J. Forrest, 1889; Trayning, Stoward; MEL. Yorkrakine near Tammin, Gardner, 9.1917; PERTH. Belle View, Yorkrakine, Tammin, Wittenoom, 12.1910, *307*; 3½ miles N. of Bullabulling, ex. herb. W. V. Fitzgerald, 11.1903, *306*; NSW. Sources of Swan R., Eaton, 1889; Between Western end of Great Bight and Victoria's Springs, Crawford; Fraser's Ra., Dempster, 1876 (*bis.*); MEL.

2. S. galegifolia (Andr.) R. Br. apud Ait., Hort. Kew., ed. 2, 4: 327, 1812.

HOLOTYPE, not seen: If extant, a specimen from Mr. Colville's garden, King's Road, Chelsea, illustrated by Andrews (loc. cit.); otherwise the illustration itself constitutes the Type.

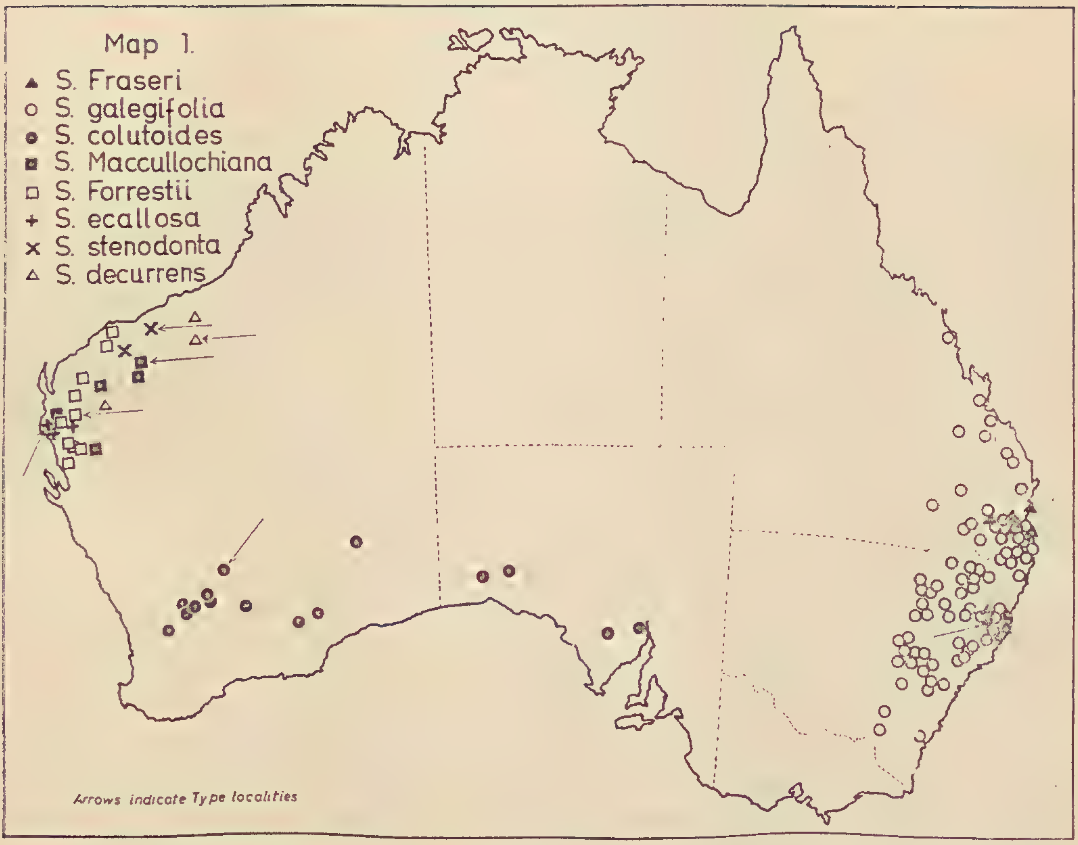
SYNONYMY (from descriptions and/or figures, no types seen):

ABSOLUTE SYNONYMS: *Vicia galegifolia* Andr. Botanists' Repository t. 319, 1803; *Colutea galegifolia* Sims, Curtis's Bot. Mag. t. 792, 1804; *Swainsona coronillifolia* var. *galegifolia* Maid. & Betche, Census N.S.W. Pl.: 107, 1916.

EQUIVALENT SYNONYMS: *Swainsona coronillifolia* Salisb., Parad. London. t. 28, 1806; *S. galegifolia* var. *albiflora* Lindl., Bot. Regist. **12** t. 994, 1826; *S. albiflora* Lodd., Bot. Cab. t. 1642, 1830. (? ex G. Don, Gen. Syst. **2**: 245, 1832); *S. Osbornii* T. Moore, Gard. Comp. t. 65, 1852; *S. galegifolia* var. *alba* Henders., Ill. Bouquet, *sub* t. 69 (*S. violacea*), 1861-4; *S. Osbornii* var. *atropurpurea* Henders. loc. cit.; *S. coronillifolia* var. *albiflora* Maid. and Betche, Census N.S.W. Pl.: 107, 1916.

Also the following, *fide* Index Kewensis, of which neither descriptions nor illustrations have been available to me: *Swainsona magnifica* Hort. ex. Dombr., Fl. Mag. **5** t. 273; *S. atrococcinea* Carrière, Rev. Hort.: 275, 1887; *S. Ferrandii* Hort., Ill. Gartenzeit, Stuttgart **7** (11), 1863; *S. galegifolia* var. *Osbornii* Hort., J. Hort. ser. 3, **49**: 547, 1904.

Decumbent to erect perennial shrub-like plants with many stems, from rather compact and under 60 cm. high to robust or slender plants about 2 m. high, specimens from higher altitudes being usually smaller and more slender; entirely glabrous or with a more or less extensive but always very sparse pubescence of fine, basifixed, woolly hairs. *Leaves* usually about 5-8 cm. long with 21-25 leaflets rather closely



spaced. *Leaflets* from almost linear to narrow-obovate, the rounded, truncate or retuse apex with a small point, commonly 7-15 mm. long (limits 6-25 mm.) and 1.5-8 mm. broad. *Stipules* broad- to narrow-deltoid, 1.7 mm. long, acute to rather obtuse. *Raceme* varying with size of plant, often about 15 cm. long with 20 flowers occupying about one-half of the length. *Flower* blue or pink, through all shades of mauve to deep cyclamen-red, red, maroon, brownish-red and yellowish (*fide* collectors' notes), about 12-16 mm. long, on a slender pedicel up to 11 mm. long or shorter and thicker, glabrous or short-pubescent, subtended by a bract 1-2 mm. or less commonly up to 3.5 mm. long. *Calyx* 4-6 mm. long, glabrous outside or rarely very sparsely woolly-pubescent, the teeth pubescent inside and shortly ciliate, very variable in size and shape being very short (1 mm.) and broad, or longer (to about 3 mm.) and acute, shorter than or equal to the tube, with a central vein often raised into a definite rib continued down the tube, the two adaxial teeth often broader and less deeply separated than the rest; bracteoles usually under 1 mm. long, variously attached on the calyx base or well below it on the pedicel. *Standard* 15-20 mm. long and broad, the claw short and narrow with two large, plate-like calli above it. *Wings* obtuse, about 15 mm. long and 4 mm. broad, the claw 3 mm. long. *Keel* obtuse, about 15-17 mm. with a claw of 4 mm. and a pair of folds near the auricle. *Ovary* usually glabrous, sometimes with a short, sparse, woolly pubescence apparently wearing off with age, about 4-7 mm. long on a gynophore of 2-3 mm. at anthesis. *Style* slender, bearded evenly for most of its length, the tip straight with a minute stigma, in rare cases with a few-haired tuft behind it as in *S. colutoides*. *Fruit* much inflated with firm coriaceous walls at maturity though more or less membranous in earlier stages, glabrous, commonly 25-40 mm. long, tapering at both ends, the suture not intruded; gynophore elongating at maturity and distinctly exceeding the calyx (up to 4 times as long), 5-10 mm. long, the inflated carpel 15-50 mm. long, 15-25 mm. in diameter, the beak 5-15 mm. long.

DISTRIBUTION: See Map 1, derived from the following specimens whose flower colour, given in parenthesis, was noted by the collectors, and from many others not annotated in this respect; a single symbol represents duplicated localities:—

Queensland: Lake's Cr., Rockhampton, Boorman, 8.1912 (blue), *250*; Prospect Cr., near Biloela, D. J. Lee, 1941 (heliotrope), *253*; Mimosa Ck., Moura, D. J. Lee, 1941 (bluish heliotrope), *252*; do., D. J. Lee, 1941 (pinkish heliotrope), *251*; NSW. Darling Downs district: About 7 miles SE of Dalby, Smith and Everist 807, 13.10.1940 (bluish; dup. NSW. *266*); Warrego district: Plevna Downs, 25 miles ENE of Augathella, Everist 1900, 10.1939 (purple); Darling Downs, Ramsay, 25.10.1930 (deep red); Greenmount, C. T. White, 12.1912 (blood red); BRI.

New South Wales: Murwillumbah, Forsyth, 10.1898 ("var. albiflora"), *267*; Tenterfield, per G.V.R.S., 28.10.1939 (red), *268*; Warialda, per G.V.R.S. 10.1939 (white tinged with blue), *270*; do., per G.V.R.S., 10.1939 (purplish blue), *269*; Ashford, Boorman, 9.1910 (pale yellow to deep red), *271*; Narrabri, Betche 17.10.1886 ("var. alba"), *272*; Baradine and Narrabri, Burrows, 12.1916 (deep red or maroon), *273*; Pilliga, Rupp, 10.1932 (purple), *255*; Pilliga to Baradine, Rupp. 10.1932 (dark blood-red, drying claret), *278*; Baradine, Pryor, 21.8.1941 (crimson), *279*; Northbridge cult., seed ex Baradine, Rupp, 16.10.1940 (brick-red), *254*; George's Ck., Macleay R., H.F.C. Davis (*ter*; mauve), 26.1.1941, *274*; *275*; *276*; Boggabri, per. G.V.R.S. 7.10.1939 (light blue), *277*; Moonbi, Betche, 23.10.1886 (very dark), *302*; Upper Hastings R., Maiden, 11.1897 ("var. albiflora"), *303*; Tooraweenah, Brodie, 7.6.1939 (bright reddish purple), *304*; Gloucester, Soppit, 24.10.1940 (mauve), *305*; Middlebrook, 10 miles NE of Scone. O'Reilly, 28.10.1940 (cyclamen), *287*; Kars Springs, 20 miles W of Scone, O'Reilly, 6.11.1940, *286*; Dubbo distr., per G.V.R.S. 8.10.1940 (pinky mauve), *288*; Harvey Ras., Boorman, 11.1905 ("of a yellow colour"), *290*; Lue near Mudgee, Boorman, 4.1901 ("var. albiflora"), *300*; 10 miles N of Bathurst, Peacock, 11.1911 (brownish), *301*; NSW.

ILLUSTRATIONS. In addition to plates cited above under Synonyms, the following are plates of *S. galegifolia*: Curtis's Bot. Mag. **41** t. 1725, 1815 (*sub S. coronillifolia*); Loudon, Arb. et Frut. Britt. **2**: 643, 1838; Guthrie and Turner, Agric. Gaz. NSW. **4** t. 10, 1893; F. M. Bailey, Weeds and Pois. Pl. of Qd.: 43, 1906; L. H. Bailey, Stand. Cycl. Hort.: 3283, 1917 (*sub* var. *albiflora*); F. M. Bailey and Gordon, Pl. Pois. and Injur. Stock: 25, 1887 (*sub* var. *coronillifolia*); Floricult. Cab. **20**: 193, 1852 (*sub S. Osbornii*); J. Hort, ser. 3, **7**: 119, 1884 (*sub S. Osbornii*), Boynton, Addisonia **8** t. 278, 1927.

3. **S. Greyana** Lindl., Edwards's Bot. Regist. n. ser. 9, t.66, 1846.

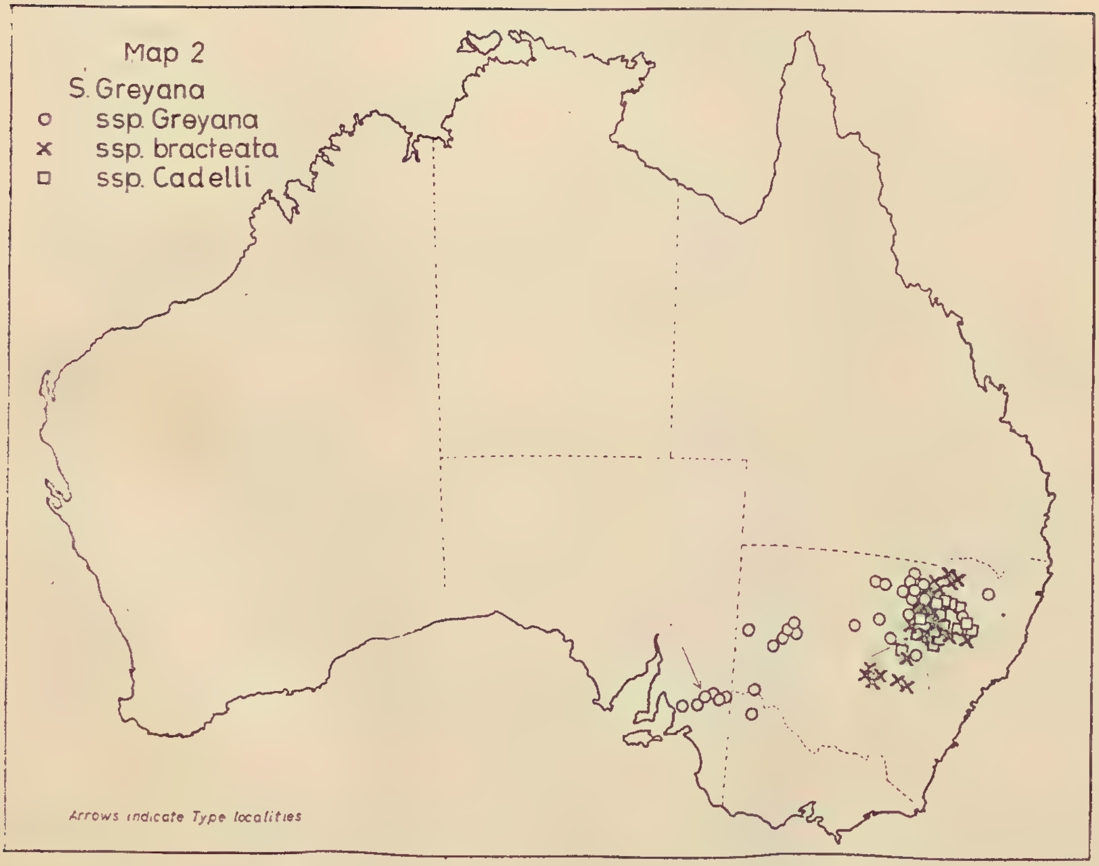
HOLOTYPE, not seen: A cultivated specimen from the garden of the Horticultural Society grown from seed collected on the banks of the Murray River and sent to the Horticultural Society by Captain Grey. If this specimen is not extant, the figure cited constitutes the Type. The writer's concept of the species has been based on the following specimen, which agrees with Lindley's plate and is from the type locality so far as it is determinable:

Swan Reach, R. Murray, S.A., Barrien, 12.1937, *2946*; ADW.

TYPE SUBSPECIES: *S. Greyana* ssp. *Greyana.*

A polytypic species here divided into three confluent subspecies which differ in the density of the woolly tomentum chiefly on the calyx, in the length of the calyx teeth, and in the length of the bracts subtending the flowers.

The species comprises shrub-like herbaceous plants with a woolly tomentum of highly variable density on the calyx and to a slighter extent on the vegetative parts, the hairs being basifixed. The leaves have usually 17-19 narrow-oblong, retuse leaflets; flowers may be white, as is common in ssp. *Cadelli,* or bright purplish-pink or lavender which is common in the other subspecies, the standard with two strongly developed plate-like calli, the keel straight with a pair of shallow folds near the claw; ovary glabrous, stipitate, with a slender style bearded all along and straight or minutely



inflexed at the tip; fruit strongly inflated, the stipes elongated, the pericarp at first more or less membranous and transparent, later thick and opaque, the suture not intruded.

Although the Types of the names *S. Greyana*, *S. Greyana* var. *bracteata* and *S. Cadelli* are readily distinguishable, it has proved impossible to divide the population of which all are members into three phenotypically distinct groups. There exists in nature an array of phenotypes showing all gradations from one extreme to the other in each of the three diagnostic characters, and on the material collected to date it is not possible to discern any constant correlation between these characters, nor any evolutionary trends within the population on which its taxonomy might be reliably based.

This fact makes the present practice of dividing the population into two species, and of relating an intermediate group to one rather than to both terminals of the series, untenable. It does not, however, indicate a taxonomic treatment which we can hope will be conclusive—an event which must await the accumulation of much more material than is at present available, or effective mass-collections.

At the same time, some nomenclatural substitute for the group is necessary, and in view of the manifest differences between the two terminal and the intermediate phenotypes, it will often be convenient to be able to distinguish them nomenclaturally. In cases such as this, where the proposed nomenclature is acknowledged to be tentative only, the minimum of necessary change is desirable.

For this reason, the three groups already named are recognised in this treatment of the species, but because of the distribution of the variants (see Map 2), and the absence of discontinuity between them, they are placed in subspecific rank within a single species, though the writer is well aware that their delimitation is to some extent arbitrary and will vary according to personal factors.

It should be noted for future reference that the variation in this group suggests the existence of a multiple cline (Huxley, 1942, p. 206) made up of three partially correlated simple clines. In the absence of sufficient material to test this hypothesis statistically, it has been considered better to adopt a conservative procedure than to attempt the application of a new taxonomic concept to an imperfectly known population.

The possibility of *S. galegifolia* being involved in this complex seems remote, but should be borne in mind if experimental work is undertaken. A few individuals of that species develop a very sparse, woolly tomentum on the calyx suggestive of *S. Greyana,* but these are rare even in a large collection of specimens. The floral bracts seem to be always smaller in *S. galegifolia* than in any of the phenotypes of the *S. Greyana* complex.

KEY TO THE SUBSPECIES.

1. Calyx densely woolly-tomentose, the teeth shorter than the tube, 1.5-3 mm. long; floral bracts densely woolly outside, 1.5-6 mm. long, usually broad .... a. ssp. *Greyana.*

1.* Calyx less densely woolly to almost glabrous, the teeth usually longer than the tube; floral bracts usually more than 7 mm. long, lanceolate to subulate.

2. Calyx rather densely to rather sparsely woolly, the teeth often 3-5 mm. long; bracts often 7-10 mm. long, lanceolate, the tomentum corresponding with that of the calyx. b. ssp. *bracteata.*

2.* Calyx almost glabrous to sparsely woolly, the teeth acuminate to subulate, 5-9 mm. long; bracts linear-subulate, almost glabrous, usually 12-20 mm. long .... c. ssp. *Cadelli.*

a. ssp. **Greyana** (Lindl. sensu orig.) comb. et stat. nov.

HOLOTYPE: as for the species.

ABSOLUTE SYNONYM: *S. Greyana* Lindl. sensu orig.

Shrub-like herbaceous perennials often about 2m. high with several stems arising from a strong woody root. *Tomentum* sparse, except on the calyx and floral bracts, the younger vegetative parts with a more or less dense vestiture of very fine, woolly hairs variously persisting. *Leaves* 5-15 cm. long with usually 17-19 leaflets (13-23). *Leaflets* often narrow-oblong, retuse, 6-25 mm. long, 2-10 mm. broad, glabrous above, usually with some woolly hairs on the underside. *Stipules* deltoid, very variable in length, 1.5-10 mm. long, glabrous inside, tomentose like the leaves outside. *Raceme* often showy, 10-12 cm. long in some plants, up to 40 cm. in others, with about 12 flowers in short, or 30 in long, racemes, occupying one-half to three-fifths of the length. *Flowers* commonly bright purplish pink or lavender, sometimes white, 15-20 mm. long on a pedicel clothed like the calyx, commonly 4-6 mm. but up to 10 mm. long. *Bract* lanceolate to ovate, glabrous inside, woolly outside, usually shorter than the pedicel, occasionally equalling it, 1.5-6 mm. long. *Calyx* white with densely matted, woolly hairs, 5-9 mm. long, the teeth deltoid, 1.5-3 mm. long, always shorter than the tube, the bracteoles often obscure in the tomentum, not exceeding the calyx and usually shorter than the tube. *Standard* 15-22 mm. long and broad, often 16-18 mm., the claw 4-5 mm. long with a pair of strongly developed, plate-like calli above it. *Wings* shorter than the other petals, 12-18 mm. long, the claw 3-5 mm. *Keel* obtuse, 14-19 mm. long, the claw 4.5-7 mm., with a pair of rather long, shallow folds near the auricles. *Ovary* glabrous, about 6-8 mm. long at anthesis, tapering gradually into a slender gynophore 2-4 mm. long. *Style* bearded evenly all along, the tip straight or minutely inflexed. *Fruit* much inflated, the pericarp at first thin, later firm and opaque, the suture ridged and not at all intruded; stipes much elongated, usually at least twice as long as the calyx; stipes about 10 mm., inflated part 30 mm. x 15 mm. diam., beak 4 mm. long.

DISTRIBUTION: See Map 2, derived from the Type and representative localities among the following specimens:—

New South Wales: Walgett, Inspector of Stock, 3.11.1908, *334*; do., G.V.R.S., 10.1939, *333*; do., Mallick, 5.10.1940, *332*; do., G.V.R.S., 1.12.1941, *331*; Euroka via Walgett, 10.1893, *330*; Walgett district, G.V.R.S., 4.9.1939, *329*; Inverell, Stock Inspector, 29.5.1934, *328*; Brewarrina, Boorman, 11.1903, *327*; do., Inspector of Stock, 28.10.1908, *326*; Namoi R., *325*; NSW. Namoi R., A. & D. Carson, 3.1887; MEL. Plains near Baradine, Forsyth, 10.1899, *324*; Quamborn, about 30 miles from Coonamble, per W. Land Board, 30.9.1907, *323*; Near Girilambone, Mullen, 1916, *322*; Cobar district, Abrahams 433, 10.1911, *321*; Wilcannia, Seddon, 9.1924, *320*; do., Andrews, 11.1918, *319*; Broken Hill, A. Morris, 11.1921, *378*; NSW. Albemarle, Darling R., A. Morris 2368, 25.10.1931 (dup. cult. Broken Hill, 11.1928); BRI. Delta, Nyngan, District Vet. Officer, 25.9.1925, *318*; Near Dubbo, Simms, 13.9.1907, *317*; NSW. Darling R., A. Morris 745, 11.1921 (dup. cult. Broken Hill, 11.1921, *316*; NSW.); BRI. Menindie, G.V.R.S., 10.1939, *315*; Wentworth, G.V.R.S., 30.10.1939, *314*; NSW.

Victoria: Australia felix, ex herb. Melbourne (*bis*), *312*; and *313*; NSW.

South Australia: Near Loxton, Denford, 15.10.1909; R. Murray, S.A.White, 12.1913; JMB. Pyup Reach R. Murray, 1.1884, Herb. Tate; AD. Swan Reach, R. Murray, Barrien, 12.1937, *2946*; ADW. North of Mannum, R. Murray, (Cleland), 28.11.1913; JBC.

ILLUSTRATIONS: Bot. Reg. **32** t. 66, 1846 (*sub S. Greyana*); Hurst, Poison Plants of N.S.W.: 190, 1942.

b. ssp. **bracteata** (Maid. & Betche) comb. et. stat. nov.

HOLOTYPE, by monotypy: Between Gilgandra and Gummin, N.S.W., Forsyth, 10.1901, *368*; N.S.W.

ABSOLUTE SYNONYM: *S. Greyana* var. *bracteata* Maid. and Betche, Proc. Linn. Soc. N.S.W. **28**: 905, 1903.

EQUIVALENT SYNONYM (ex descript.): *S. grandiflora* R. Br. in Sturt, Narrative of Exped. Cent. Aust. **2**, Appendix: 74, 1849. *Holotype* not seen, location not known: " 'Common on the rich alluvial flats of the Murray and Darling' D. Sturt."

Similar to ssp. *Greyana*, but approximating also to ssp. *Cadelli* (see below). The significant differences are in the following characters: *floral bracts* longer than in ssp. *Greyana*, broader and usually shorter than in ssp. *Cadelli*, lanceolate to almost ovate, often 7-10 mm. long (lanceolate, 12 mm. long in Holotype); *pubescence* moderately dense, less so than in ssp. *Greyana*, more dense than in ssp. *Cadelli; calyx* variable in length, the teeth sometimes short (2 mm.) as in ssp. *Greyana*, sometimes long, acuminate, approaching those of ssp. *Cadelli;* to 5 mm. long (in Holotype, calyx 6.5 mm. long, the teeth 2.5 mm.); *flowers* 13-16 mm. long, in the Holotype 13-14 mm.

DISTRIBUTION: See Map 2, derived from the Type and representative localities among the following specimens:

New South Wales: Gurley, Moree district, Cheel, 28.12.1928, *377*; Moree, Carne, 5.1914, *376*; NSW. Moree, (Cleland), 25.10.1917; do., (Cleland), 23.1.1912; AD. Pilliga, Inspector of Stock, 23.10.1908, *375*; do. Inspector of Stock, 10.1908, *374*; Pilliga scrub, S. L. Black, *373*; T. S. R. Cryon, Walgett, G.V.R.S., 18.7.1939, *372*; Burren Junction, Inspector of Stock, 11.1908, *371*; do., G.V.R.S., 10.1939, *370*; Near Kenebri, Pilliga-Baradine Road, Rupp, 26.10.1932, *369*; Gilgandra, Barling per Cambage, 4.1913, *367*; do., per Penfold, 12.1927, *366*; Coonamble, Cleland, 10.1914 (dup. AD), *364*; Tooraweenah via Gilgandra, Chief Inspector of Stock, 11.1922 (dup. BRI.), *363*; Mullaley via Gunnedah, Thompson, 2.9.1909, *362*; Breeza, Stock Dept., 10.1908, *361*; Harvey Ranges, Peak Hill, Boorman, 11.1905, *360*; Condobolin, Beadle, 20.10.1941, *359*; do., Boorman, 9.1906. *358*; Cadow State Forest, Condobolin, Hadley, 14.2.1929, *357*; Edols State Forest, Condobolin, Hadley, 28.12.1928, *356*; Bogan Gate, Boorman, 11.1906, *355*; Cumbijora State Forest, 12 miles E. of Forbes, Walker, 4.1918, *354*; NSW.

c. ssp. **Cadelli** (F. Muell. ex Moore and Betche) comb. et stat. nov.

Lectotype: Warrumbungle Ranges (cited in original description as "Coonabarabran") N.S.W., Betche 143, 1.1883; MEL. *Lectohaptotypes* (very probably *Lectoisotypes*) numbered Betche 89; Betche 61; Betche 136; MEL. also Betche 17, *379*; and without reference number, *340*; NSW.

Lectoparatype: Gulargambone, N.S.W., Cadell, 9.1886, *339*; NSW.

Absolute Synonym: *S. Cadelli* F. Muell. ex Moore and Betche, Handbk. Fl. N.S.W.: 150, 1893.

Plants very similar in habit to those of the other two subspecies, the leaves sometimes shorter with somewhat smaller leaflets, almost glabrous. *Stipules* sometimes narrower, acuminate, up to 12 mm. long. *Raceme* 12-30 cm. long with up to 20 flowers in about one-half of the length. *Flowers* commonly white, sometimes bluish, 12-15 mm. long, on a pedicel of 2-6 mm. always much exceeded by the linear subulate, rarely very narrow-oblanceolate bract of 12-20 mm. *Calyx* sparsely or very sparsely pubescent with short woolly hairs, or almost glabrous, 9-14 mm. long, with long subulate teeth 5-9 mm. long and distinctly longer than the tube; bracteoles similar to the bracts and calyx teeth in shape, 6-10.5 mm. long. *Petals* as in ssp. *Greyana*, but the keel often shorter, 8-15 mm. long with a claw of 4-5 mm. *Ovary* and *fruit* usually as in ssp. *Greyana* or the inflated section of the fruit sometimes nearly as deep as long.

Distribution: See Map 2, derived from the Types and the following specimens:—

New South Wales: Namoi, Woolls, 1878; MEL. Narrabri West, Boorman, 6.1907, *352*; Narrabri, ?Betche, *351*; Gwabegar, Pilliga, Rupp. 10.1932, *350*; NSW. Between Baradine and Wongan near the latter, (Cleland), 12.10.1918; AD. Coonamble, Ryan, 9.1926, *349*; Gunnedah, Nowland, 6.1905, *348*; do., Adams, 7.1926, *347*; do., Waterhouse, 3.1914, *346*; Garradilla Stn., Coonabarabran, Inspector of Stock, 10.1922, *345*; Coonabarabran, G.V.R.S., 20.10.1935, *344*; Tambar Springs, Coonabarabran, G.V.R.S., 8.1939, *343*; Coonabarabran district, Inspector of Stock, 11.1908, *342*; Warrumbungle Ras., Forsyth, 10.1899, *341*; Narromine, A. Morris 2246, 5.10.1928, *335*; NSW.

4. S. **brachycarpa** Benth., Fl. Aust. 2: 217, 1864.

Lectotype: Jimba (?Jimbour), plains of the Condamine, Qd., Leichhardt (per Pemberton Hodgson); MEL.

Lectoparatypes: (1) Darling Downs, Qd., Leichhardt (*bis*); (2) Clarence R., N.S.W., Beckler; (3) New England (nr. Clifton, 311), N.S.W., C. Stuart; MEL (Burnett R., F. Mueller; not seen).

A decumbent or ascending glabrous plant, often small, the slender stems sometimes exceeding 60 cm. in length and occasionally rooting at the lower nodes. *Leaves* commonly 4-6 cm. long, sometimes smaller or up to 13 cm. long, the number of leaflets varying rather widely even in the mature leaves of one plant, commonly 15-21 but fewer (11) or more numerous (25) in some specimens. *Leaflets* mostly narrow- to broad-oblong, sometimes narrow-oblanceolate to obovate, the apex rounded and usually with a shallow notch, 3-12 mm. long, 1-4 mm. broad but commonly 5-9 mm. x 2-3 mm. *Stipules* small, deltoid, 1-2 mm. long. *Raceme* 5-20 cm. long with about 4-6 flowers (less commonly 2-12) near the apex. *Flowers* mauve to purple, 6-10 mm. long (usually 6-8 mm.) on a slender pedicel 1-2 mm. long in the axil of a minute bract only half as long as the pedicel. *Calyx* 2-3.5 mm. long, the teeth 0.5-1.5 mm. with a few hairs inside, the bracteoles minute and often obscure, quite glabrous outside except in three isolated collections from the Grampians (Victoria) in which the calyx has a fine, sparse pubescence of short hairs. *Standard* (Fig. 2a) 6.5-11.5 mm. long and as broad as or often slightly broader than long, the claw 1.5-2.5 mm. with two small, distinct, plate-like calli above it. *Wings* 5-8 mm. long, narrow obtuse or subacute, the claw about 2 mm. long. *Keel* obtuse, usually 6-8 mm. long, sometimes 5.5-10 mm. with a claw 2-3 mm. long and sometimes a pair of shallow folds above it. *Ovary* (Fig. 2b) glabrous, 2-4 mm. long at anthesis, tapering gradually at both ends, the gynophore slender 1-2.5 mm. long. *Style* (Fig. 2b) bearded all along, the apex with a tuft of hairs behind the inflexed tip. *Fruit* inflated, with a thin pericarp, greenish-translucent or dark coloured at different stages, the suture vein-like, not intruded; stipes elongated to about 5 mm., and about the same length of the style persisting as a beak, the inflated carpel 15-23 mm. long.

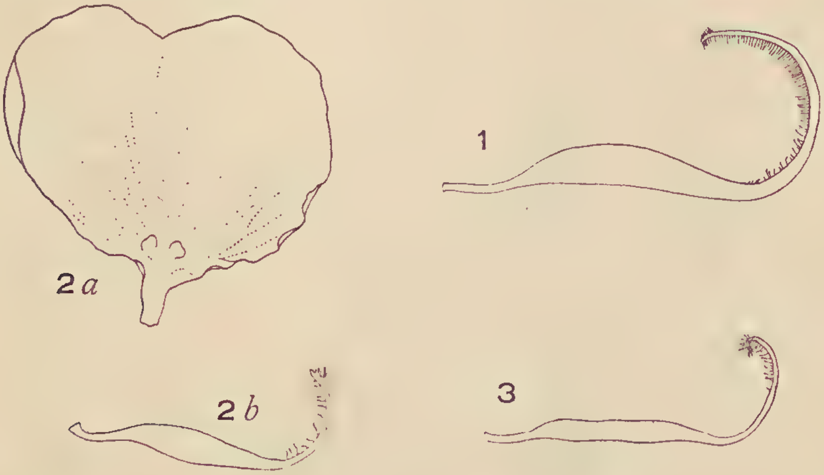


Fig. I. *S. colutoides* : pistil with tuft behind the stigma. Figs. 2a, b. *S. brachycarpa* : 2a. standard with plate-like calli ; 2b. pistil. Fig 3. *S. Fraseri* : pistil with long hairs behind the coiled style tip. (All x 3.5.)

DISTRIBUTION: See Map 3, derived from the Types and representative localities among the following specimens:—

Queensland: Broadsound, St. Laurence, Gulliver, 10.1873; Condamine 420; Araucaria Ras. (Bunya Bunya), Leichhardt, 30.8.1843; Near Groman Ck., Moreton's Bay, C. Stuart 190, Novr.; MEL. Brisbane, Maiden, 6.1906, *405*; NSW. Near Brisbane R., Dietrich, 1863-5; Christmas Ck., C. T. White 10233, 8.10.1933; "Prob. Pine R.," Statter; Main Ra., Hartmann 640; Taylor's R. and Ithaca Ck., F. M. B(ailey); Ipswich, Hall 177, 8.1909; BRI. Towards Moreton's Bay—Between Archers and Moreton Bay, Leichhardt, 15.1.1844; Murrum Murrum, Leichhardt, 13.10.1843; MEL.

New South Wales: Near Maryland at N.S.W.-Q'land border, E. Hickey 43, 11.1884; Timbarra, (?C. Stuart) 86, Nov.; Richmond R., Fawcett; Woram, Richmond R., Coll. ?174; MEL. Drake, Boorman, 10.1901, *404*; Myrtle Ck., Richmond R., Hooke, 11.1913, *400*; Tenterfield, Betche, 11.1886. *397*; NSW. Boonoo Boonoo, Knoetzsch, 12.1884; do. via Tenterfield, Knoetzsch, 1.1885; Tenterfield, ?C. Stuart, Oct.; Sources of Dumaresq R., Hickey, 1885; Clarence R., Wilcox, 11.1875; do., J. Wilcox, 1869; Clarence's R. labelled "Syntype"; New England, C.St(uart) 311; "Probably from N. Eng. (C.St.)"; MEL. Orara R., Cheel, 9.1916, *401*; New England ex Herb. Melb., *396*; Glenreagh, Monk, 10.1934, *398*; Dorrigo, Boorman, 11.1913, *402*; Guy Fawkes. Boorman, 12.1909, *407*; Pt. Lookout, New England National Park, McKie 2307, 20.2.1940, *406*; Pt. Lookout, Ebor district, Clarke, 3.1940, *403*; Ebor Falls, Davis, 31.1.1941, *681*; Pt. Lookout, Davis, 31.1.1941, *399*; NSW. Hastings R., Beckler; Ex Melb. Bot. Gardens; without loc., Moore 223, 1865; MEL.

Victoria: Grampians, Frost, 1891; Hall's Gap, Grampians, Tilden, 12.1912; Mt. William (Grampians), Sullivan 35. 11.1871; MEL.

S. FRASERI.

This species is related, particularly in the characters of its ovary and fruit, to both the preceding and subsequent groups, and indeed bears a strong superficial resemblance to *S. brachycarpa.* Its standard, however, is ecallose, and the style tip is incurved or almost coiled, two characters not seen in either of these groups, and the plants are more or less hoary with adpressed hairs. The small area of its occurrence, and the hairs behind the stigma are further similarities to *S. brachycarpa.*

5. S. Fraseri Benth., Fl. Aust. 2: 224, 1864.

LECTOTYPE: Hastings R., N.S.W., Beckler; MEL. (*Haptotype,* NSW. *393*). LECTOPARATYPE: Moreton Bay, Qd., C. Stuart; MEL.

The third of the Syntypes cited by Bentham: Macquarie R., Fraser, is preserved at Kew, according to C. T. White, who provided the following information: "This species was drawn up from a mixture. Fraser's plant from the Macquarie R. is only a small piece with the flowers in a poor state of preservation. The ovary, however, is definitely sessile and I should say the specimen represents *S. lessertiifolia* DC (Emend. Summerhayes K.B. 1926: 239). The Moreton Bay plant is not at Kew. Beckler's specimen referred to by Bentham is too tightly stuck to the sheet to easily detach a flower for dissection."

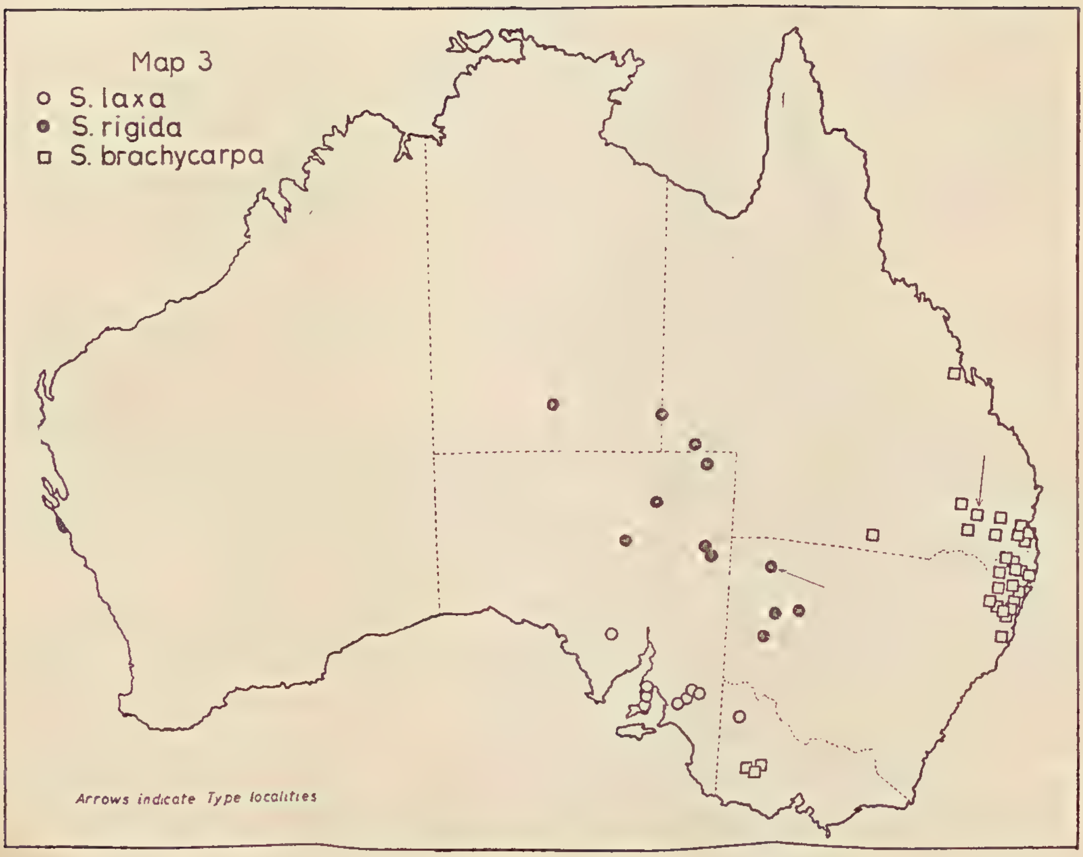
While the procedure of basing the epithet *Fraseri* on a Lectotype collected by Beckler is not exemplary, it is necessary here since the description obviously applies to Beckler's and Stuart's specimens and cannot have been derived in its diagnostic essentials from Fraser's specimen with its sessile ovary. However, Fraser's specimen is not likely to be *S. lessertiifolia* if its "Macquarie R." label is authentic, so its true identity remains uncertain.

A tall, ascending plant with stems usually well over 30 cm. (attaining 2 m., *fide* Bentham) with a very sparse pubescence of short, adpressed, basifixed hairs. *Leaves* often about 10 cm. long (6-16 cm.; 9.5 cm. in Lectotype) with 13-27, usually 21-25 leaflets, 21 in Lectotype. *Leaflets* rounded-oblong to narrow-oblong, the apex often slightly retuse with a minute point, glabrous above, sparsely pubescent or glabrescent below, 7-18 mm. long, 2-7 mm. broad (9-16 mm. x 4.5-7 mm. in Lectotype). *Stipules* deltoid, acute to shortly acuminate, 1.5-6 mm. long, 5 mm. in Lectotype. *Raceme* up to 25 cm. long with up to 25 flowers occupying one-half to two-thirds of this length. *Flowers* pale mauve to purple, 10-12 mm. long, on a slender pedicel 3-7 mm. long with a few hairs and subtended by a narrow bract about one-third as long as the pedicel. *Calyx* glabrous or very sparsely pubescent, 3.5 (as in the Lectotype)-5.5 mm. long, the teeth 1-2.5 mm., always shorter than the tube, the bracteoles at its base not exceeding 1 mm. long. *Standard* 10-12 mm. long and broad, the claw 2.5-3.5 mm. long, without any calli. *Wings* 8 (as in the Lectotype)-11 mm. long, the claw 2.5-4 mm. *Keel* obtuse 9-11 mm. long, the claw 3-5 mm., with a pair of folds above it. *Ovary* (Fig. 3) glabrous, 4-6 mm. long at anthesis on a slender gynophore about 2 mm. long. *Style* (Fig. 3) bearded rather sparsely but with a dense tuft of longer hairs behind the stigma at the incurved or almost coiled tip. *Fruit* ellipsoid, tapering at both ends, the stipes 6-10 mm. long and the persistent stylar beak about as long, the inflated carpel thin, glabrous, about 3 cm. long, the suture not intruded.

DISTRIBUTION: See Map 1, derived from the Types and the following specimens:—

Queensland: Bribie Island, Eaves, 1872; Brisbane R., Simmonds, 9.1899; Indooroopilly, Cribb, 9.1930; S. E. Queensland, Gillies, 15.8.1921; Enoggera Ck., F.M.B.(ailey), 2.1875; BRI.

New South Wales: Kempsey, Nisbett, 10.1924, *394*; Hastings R., *392*; NSW. Port Macquarie, 10.1896; AD. Port Macquarie, Brown, 2.1897, *682*; NSW.



THE LAXA GROUP.

S. laxa and *S. rigida.*

This group comprises another *Artenkreis* of two species. While related in the character of their fruits to the GALEGIFOLIA Group and to *S. Fraseri,* their ecallose standard distinguishes them from both.

There is a complete, though small, discontinuity between *S. laxa* and *S. rigida* as represented by the specimens cited, based on the characters of stipules, relative length of calyx teeth and pubescence. There is, however, a tendency to assume an intermediate condition in other, indicative, characters, chiefly the leaflet shape and wing shape, as well as in the calyx characters, in specimens from the Darling R. near Menindie. It will be seen from the map that *S. rigida* is known from Central Australia and the dry interior (the 5-inch rainfall belt), while *S. laxa* occurs on the outer side of the 10-inch isohyet. The specimens of *S. rigida* which approach *S. laxa* in form are thus approximate in their location also. It is possible, therefore, that further collections may reveal a less complete discontinuity than at present appears to exist. The specimens now available, however, being all distinguishable as belonging to one or other of the groups, justify their retention as species.

Differences between the species of the Group, and their relation to *S. brachycarpa* of the GALEGIFOLIA Group, are summarised in Table II:—

TABLE II.

Species.	Standard.	Flowers.	Stipules.	Calyx.	Habit.
S. brachycarpa	With distinct calli (fig. 2a).	Purple, pinkish or mauve.	Small, deltoid, 1–2 mm. long.	2–3·5 mm. long, glabrous or pubescent, the teeth 0·5–1·5 mm. long.	Slender decumbent.
S. laxa............	Ecallose	Yellow	Leafy, broad, 5–8 mm. long and as broad (fig. 4a).	3–4 mm. long, quite glabrous, the teeth 1·5–2 mm. long (rarely 1 mm.) (fig. 4b).	Ascending, stems robust.
S. rigida	Ecallose	Yellow, sometimes the wings purple tipped.	Narrow, 1–4 mm. long, often not long-persisting (fig. 5a).	3·5–5·5 mm. long, pubescent outside or shortly ciliate, with short teeth up to 1·25 mm. long (fig. 5b).	do

6. S. laxa R.Br. in Sturt, Narrative of an Expedition into Central Australia, 2, Appendix: 76, 1849.

Holotype, not seen: "Statio nulla indicata, in Herb. D. Sturt" (Collected by Charles Sturt on his expedition into Central Australia, 1844-6).

An erect or ascending plant with rather robust, finely striate stems 15 to over 40 cm. long, completely glabrous except for a very few hairs on the youngest parts. *Leaves* 6-12 cm. long, commonly 8-10 cm., with about 15-17 leaflets. *Leaflets* (Fig. 4a) narrow-obovate to almost obovate, the apex usually emarginate, 8-17 mm. long, 5-8 mm. broad, completely glabrous. *Stipules* (Fig. 4a) broad and leafy, entire, 5-8 mm. long with a base of about the same width, persistent. *Raceme* 15 to over 20 cm. long with about 15-20 flowers occupying more than one-half of this length. *Flower* yellow, 9-11 mm. long on a glabrous pedicel of 2-4 mm. exceeding by about half the narrow to deltoid bract. *Calyx* (Fig. 4b), 3-4 mm. long with a contracted stalk-like base, the teeth 1.5-2 mm. long (rarely 1 mm.) without any hairs inside or out; bracteoles 0.5-1 mm. long, attached on the contracted base. *Standard* 10-11 mm. long and almost as broad (9-10.5 mm.), the claw 1.5-2.5 mm., without calli. *Wings* narrow, subacute, 7.5-8.5 mm. long, 1.5-2 mm. broad, the claw 2 mm. *Keel* obtuse, 9-10.5 mm. long, the claw almost 3 mm., very deep, without any pouches or folds. *Ovary* glabrous, flattened, 3.5-4 mm. long on a slender gynophore of 1.5 mm. at anthesis. *Style* (Fig. 4b) not long, scantily bearded all along, the upturned part short, tapering into a slender straight tip, with a tuft of hairs behind the stigma. *Fruit* (Fig. 4b, in a very young state) slightly inflated but still flattened, the pericarp membranous at first, finally firm and more or less reticulate, suture ridged and not intruded, the stipes elongating to about 4 mm.; mature fruit about 10-15 mm. long, 8 mm. broad.

Distribution: See Map 3, derived from the following specimens:—

Victoria: Walpeup, Williamson, 9.1913, *409*; NSW.

South Australia: Wirrulla School, Eyre Penins., 1.1927 (mixed with *S. rigida*); JMB. Yorke's Peninsula, E. Beythien, 1890; Virgulti Murray scrub Morundam versus, Behr; Rogue's Gully, Muloowurtie, Tepper 731; MEL. Rogue's Gully near Ardrossan (2nd label Muloowurtie), Tepper, Summer 1879; AD. Hundred of Mantung, 30 miles E. of Swan Reach, W. Gill, 1.1911, *408*; NSW. N. of Mannum, R. Murray, 28.11.1913; JBC. Mannum, D.C. of Mannum, 12.3.1942, *4543;* ADW. Yorke's Peninsula, Tepper 1138; MEL.

7. S. rigida (Benth.) J. M. Black, Trans. and Proc. Roy. Soc. S. Aust. 51: 380, 1927.

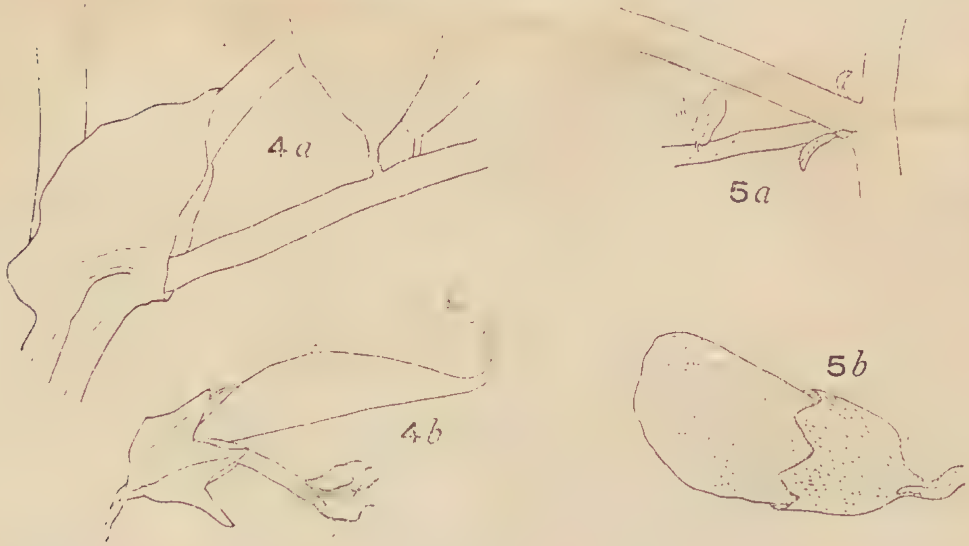
LECTOTYPE: near R. Darling, N.S.W., V.E.E., 31.10.1860; MEL.

LECTOPARATYPES: near the Darling R., N.S.W., Dallachy—Several specimens with various labels grouped under the designation "*S. laxa.* John Dallachy's collection from the Darling R., N.S.W., Nov. 1858"; MEL.

ABSOLUTE SYNONYM: *S. laxa* R.Br. var. (?) *rigida* Benth., Fl. Aust. **2**: 224, 1864. *Lectotype* as for *S. rigida.*

From his publication it is not clear whether Black intended to base his specific name *S. rigida* on the type of Bentham's var. *rigida* or on the specimens which he cited. The designation of Lectotypes for the two names above is intended to fix the typification of the group permanently.

Very similar in habit to *S. laxa,* but often sparsely hoary with fine, short, basifixed hairs on the stems, leaves and calyces. *Leaves* 4-10 cm. long, commonly 5-7 cm. with 13-15 leaflets. *Leaflets* oblong, narrow-oblong or obovate-emarginate, mostly 2-5 mm. long and 1-3 mm. broad, rarely 7 mm. x 5 mm. and thus approaching the form in *S. laxa.* *Stipules* (Fig. 5a) narrow-deltoid, 1-4 mm. long, apparently short-lived. *Raceme* 15 to more than 40 cm. long, with about 15-20 flowers in the upper half, the lower flowers often widely spaced. *Flower* yellow except for the wing petals which, in some specimens at least, are brownish-purple distally, 9-15 mm. long on a pubescent or glabrous pedicel, 2-3 mm. long, subtended by a deltoid bract about 2 mm. long. *Calyx* 3.5-5.5 mm. long, often with a sparse, adpressed pubescence outside, the teeth very short, 1.25 mm. or less in length, pubescent on the inside and shortly ciliate; bracteoles 0.5-0.75 mm. long. *Standard* distinctly longer than broad (by 3-5 mm.)



Figs. 4a, b. *S. laxa* : 4a. stipules and leaf-base ; 4b. calyx and immature pod. Figs. 5a, b. *S. rigida*: 5a. stipules and leaf-base (these leaflets of minimum size for the species) ; 5b. bud with calyx. (All x 3.5.)

6-11 mm. broad, 9-15 mm. long, without calli but with a hollow convexity (sometimes very slightly thickened) above the claw on the inner (abaxial) surface; claw 2-4 mm. long. *Wings* 7.5-12 mm. long, about 2 mm. broad, the claw 2.5-4 mm. long, the apex broadly rounded or truncate, rarely subacute on a narrow wing. *Keel* obtuse but scarcely as deep as in *S. laxa,* 9-14 mm. with a claw 2.5-4.5 mm. long, without pouches or folds. *Pistil* as in *S. laxa* but the ovary (4-6.5 mm.) and gynophore (1.5-2.5 mm.) longer and the fruit perhaps also larger, 10-20 mm. long, 6-8 mm. broad.

DISTRIBUTION: See Map 3, derived from the Types and the following specimens:—

?Northern Territory or *Queensland*: Central Australia, Ch. Winnecke, 1883; MEL. Near Camp 17, S.D.E. (N.T.-Q'land border, *ca.* 24° 45'S.), 27.6.1939; AD. Diamantina, Dr. Morgan, 8.1930; JBC.

New South Wales: Darling R., "flores lutei" ex Herb. Melb., *410;* Menindie, Beadle, 11, 1939 (*ter*), *411, 412,* and *413*; NSW.

South Australia: Minnie Downs, L. Reese; JMB. Camp 40, S.D.E. (near Kalamarinna Stn.), 27.7.1939; AD. Irrapatana, 25.8.1932 (dup. JMB); Carraweena, Strzelecki Ck., 1.6.1924; Lake's Crossing near L. Callabonna, 31.5.1924 (dup. JMB; K?); JBC.

THE MACCULLOCHIANA GROUP.

S. Maccullochiana, S. Forrestii, S. ecallosa, S. stenodonta and S. decurrens.

Some members of this group of exclusively Western Australian species are not as well represented as might be wished, but, on the evidence of material available, there appear to be complete morphological discontinuities between them. This absence of intermediate forms, in spite of the very real similarity and sympatric nature of the groups, suggests complete biological isolation from one another, and specific rank seems justified.

The differences between the first three species are differences in size: size of plant, size of flower (length of petals) and of fruit. Specimen of *S. Maccullochiana* have the largest plants, the largest flowers with long narrow petals, and the largest fruits; in *S. ecallosa* the plants, flowers and fruits are smaller, and in *S. Forrestii* the decrease is continued. All these species have a similar, evenly distributed pubescence. In *S. stenodonta* the plant- and flower-size and the petal lengths are comparable with those of *S. Forrestii,* but there is no pubescence.

The ovary, which in the first three species is densely pubescent, has a band of hairs along the suture only in *S. stenodonta. S. decurrens* is again comparable in size with the last two, smallest species, pubescence is present and of the type seen in the other species of the group but often marginal only on the leaflets and the hairs longer; the ovary is glabrous, or like that of *S. stenodonta,* hairy along the suture only, and the style tip is tufted as in *S. ecallosa;* the single-stemmed, tree-like habit of *S. decurrens* is seen also in *S. Maccullochiana,* and these two species have much larger stipules than the others of the group, those of *S. decurrens* being, perhaps, the larger in spite of the smaller size of its floral parts.

The distinguishing characters of the members of the group are summarised in Table III.

8. S. Maccullochiana F. Muell., Fragm. Phyt. Aust. 7: 25, July, 1869.

HOLOTYPE, by monotypy: Hammersley Ra., NW Australia, Maitland Brown; MEL. Mueller's citation was: Ad ripas sinus Nichol Bay et montium Hammersley Range; Maitl. Brown. There is, however, only one specimen in the Melbourne Herbarium to which this citation could apply, and it seems likely that the occurrence at Nichol Bay was simply reported by the collector. If another (Nichol Bay) specimen is found to be extant, the Hammersley Ra. specimen should be regarded as Lectotype for the species.

TABLE III.

Species.	Habit.	Standard.	Wings.	Keel.	Pubescence.	Stipules.
S. Maccullochiana	Tree-like with a single stem, to 2 m. high.	Longer than broad, 30–35 mm. x 20–25 mm.	Usually shorter than the standard, *ca.* 25 mm. long.	Long and narrow, 25–30 mm. long (fig. 6b).	Not dense but evenly distributed; ovary densely pubescent all over.	Large, broad, up to 2·5 cm. in greatest dimension.
S. ecallosa	Tall erect or ascending herb, *ca.* 70 cm. high.	Often a little longer than broad, 22–25 mm. x 20 mm.	14–15 mm. long, much shorter than the other petals.	18–20 mm. long (fig. 7b).	do do ...	Narrow, 2–3 mm. long.
S. Forrestii	Rather stiffly ascending herb, *ca.* 40 cm. high.	Length and breadth about equal, 9–12 mm.	8–10 mm.	9–10 mm. long (fig. 8b).	do do ...	Narrow, 3–6 mm. long.
S. stenodonta	Ascending, stem *ca.* 65 cm. long.	Length and breadth about equal, 8–9 mm.	7–8 mm.	8·5–9 mm.	Absent; ovary with a narrow band of hairs along the suture.	Narrow, 3–8 mm. long.
S. decurrens	Single - stemmed (at least in the Type).	Length and breadth about equal, 9–11 mm.	7·5–9 mm.	8·5–9·5 mm. (fig. 8 *bis* b).	Soft, pale, more or less evenly distributed on stems; on leaflets usually long, marginal only or sparse on lower surface, ovary glabrous or with a line of hairs along the suture.	Very large, strongly decurrent on the stem, often overlapping due to crowding of the leaves, up to 3·5 cm. long (fig. 8 *bis* d).

A tall, erect, shrub-like plant with a single stem at the base, up to nearly 2 m. high, clothed with a rather sparse pubescence of fine, soft, loosely adpressed to spreading, basifixed hairs. *Leaves* large, about 20-25 cm. long, with 27-29 leaflets (1 specimen only). *Leaflets* narrow-oblong or elliptical to broad-elliptical, often 20-40 mm. x 15-20 mm., widely spaced on the rachis. *Stipules* large, leaf-like, often with a few teeth, up to 2.5 cm. in the greatest dimension. *Raceme* about 40 cm. long, the large flowers numerous (sometimes over 40, as in the Type), occupying more than one-half of the length. *Flowers* rose-purple or white, fading to blue (*fide* C. A. Gardner 3296), "laete purpurea" according to the original description, 30 mm. long on a pedicel of about 5 mm., subtended by a subulate bract of about the same length. *Calyx* softly pubescent with pale hairs, the tube 7-8 mm. with lanceolate teeth 5-6 mm. and linear bracteoles 1.5-2 mm. long attached to its base. *Standard* large, distinctly longer than broad, 20-25 mm. x 30-35 mm. with a claw of about 4 mm. and two slightly thickened divergent ridges above it. *Wings* usually shorter than the standard, about 25 mm. long, obtuse, with a claw of about 5 mm. *Keel* (Fig. 6b) subacute, long and narrow, without any pouches, equalling or slightly exceeding the wings, 25-30 mm. long, the claw about 7 mm. *Ovary* (Fig. 6a) densely adpressed-silky with pale hairs, about 10 mm. long on a gynophore of 6 mm. at anthesis. *Style* (Fig. 6a) slender, tapering gradually to a straight tip without any tuft behind the stigma, the beard even, dense, extending for most of the length. *Fruit* (Fig. 6c) inflated, the wall thin but firm, softly pubescent, the suture intruded for half the diameter, about 3 cm. long and 1 cm. in diameter, the stipes elongating to about 12 mm. in nearly mature specimens.

DISTRIBUTION: See Map 1, derived from the Type and the following specimens:—

Western Australia: Head of Hardey R., Gardner 3296, 26.8.1932; PERTH. Between Gascoyne and Fortescue Rs., H. S. King, 1885; Manilyalya (*recte* Minilya) R., North of Shark Bay, J. Forrest, 1882; Gascoyne R., J. Forrest, 1882; MEL.

Also not mapped: Hamel (cult.) Berthoud, 25.2.1941, *414*; NSW.

ILLUSTRATION: Curtis's Bot. Mag. **131**, t. 7995, 1905.

9. **S. ecallosa** Sprague, Gdnrs' Chron. 33 (852): 274, 25.4.1903.

HOLOTYPE not seen; cultivated in England from seeds sent from the Minilya R., W.A., by Messrs. Barr and Sons.

Apparently a tall, erect or ascending herb with rather stout stems, 0.7 m. high according to the original description, clothed with a somewhat scanty pubescence of fine, silky, loosely adpressed or spreading basifixed hairs. *Leaves* 6-12 cm. long with about 19 leaflets (13-21 in original description). *Leaflets* narrow-obovate to oblong, the apex usually notched and mucronulate, about 2 cm. long, 7-10 mm. wide, glabrescent above, scantily pubescent below. *Stipules* narrow-deltoid to almost subulate, about 2-3 mm. long, with a few hairs chiefly on the margin. *Raceme* 18-20 cm. long with about 20 flowers occupying more than half of its length (but in the original description with only 4-5 flowers on a long peduncle), the peduncle pubescent. *Flower* drying violet-coloured, about 20 mm. long on a pedicel of about 3 mm. in the axil of a narrow, scarious, ciliate bract about 2 mm. long. *Calyx* tube 5-6 mm. long, the lanceolate teeth 4 mm., rather sparsely pubescent in the two specimens cited, with a pair of narrow bracteoles about 1 mm. long. *Standard* much longer than the wings and perhaps narrower than long, 20 mm. x 22-25 mm. tapering gradually into the narrow 4.5 mm. claw, without any calli except two slightly thickened divergent lines above the claw. *Wings* 14-15 mm., the claw 4-5 mm. long, much shorter than the other petals. *Keel* (Fig. 7b) subacute, 18-20 mm. with a long claw of 8-10 mm., without any distinct pouches but two very slight folds above the claw. *Ovary* (Fig. 7c) densely adpressed-silky with white hairs, about 4.5-6 mm. long at anthesis on a distinct, slender gynophore 3-5 mm. long. *Style* (Fig. 7c) with a fairly dense, long beard for most of its length, slender and tapering to the straight tip with a weakly developed, apparently transient hair-tuft behind the stigma. *Fruit* (Fig. 7a) ovoid, inflated, softly pubescent, the suture apparently not much intruded (but perhaps not fully mature), the wall thin but firm, 16 mm. long, 8 mm. in diameter in one specimen, the stipes elongating slightly (at least 5 mm. in nearly mature fruits).

DISTRIBUTION: See Map 1, derived from the Type and the following specimens:—

Western Australia: Minilya R., Gardner 3201, 28.8.1932; PERTH. Between Gascoyne R. and Cape Farquhar, Survey Expedition (2), 1883; MEL.

10. S. Forrestii F. Muell. (ined.).

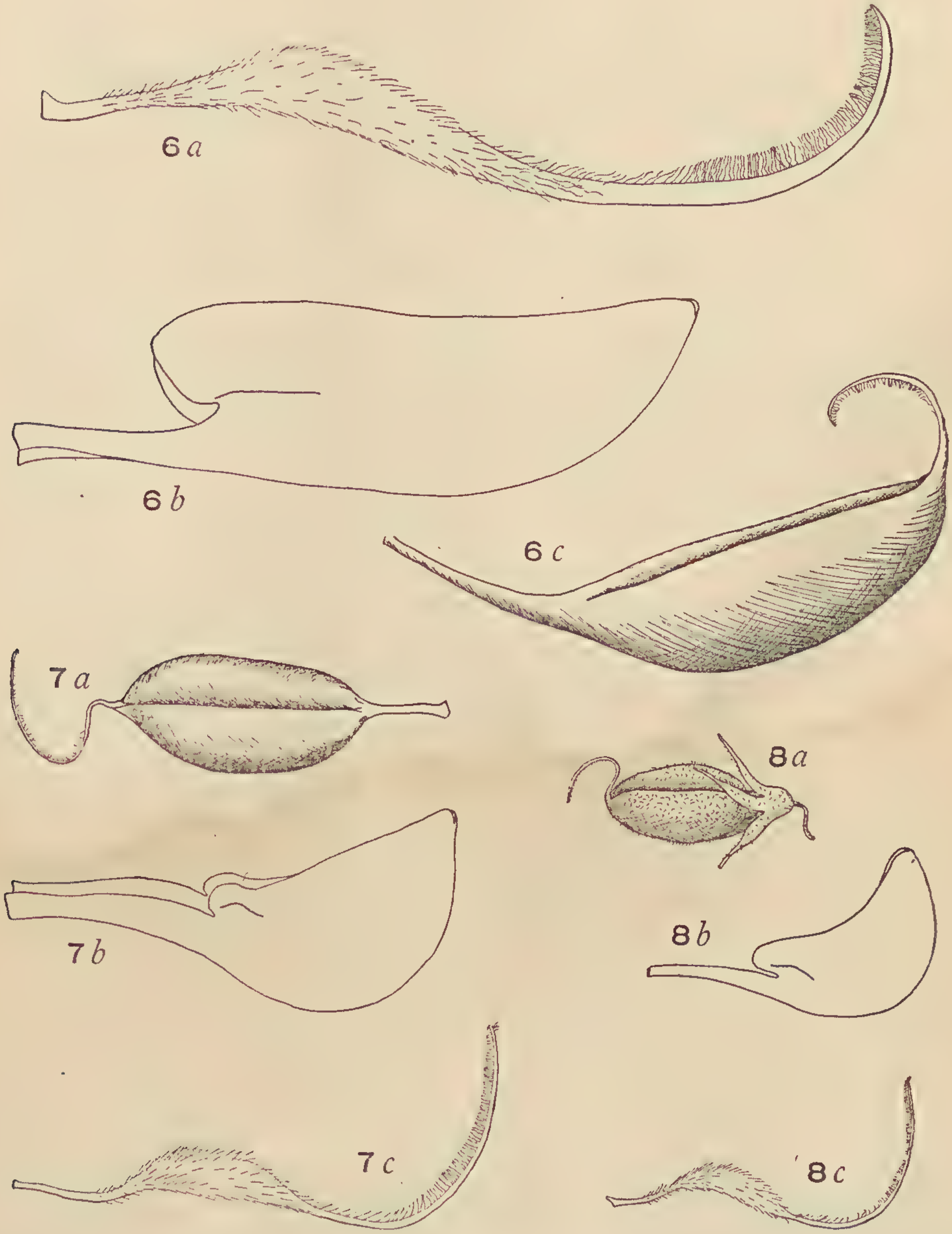
HOLOTYPE: Head of Menilyalya (now Minilya) R., W.A., John Forrest, 1882; (also a Haptotype labelled: Head of Menilyalya R., Shark Bay, J. Forrest, 1882) MEL. The Holotype is presumably the specimen exhibited by Mueller at the meeting of the Field Naturalists' Club of Victoria and published as *S. forresti*, but apparently never described (Vict. Nat. **8** (9): 131, Jan. 1892). It was the only mounted specimen bearing the name found in the Melbourne Herbarium at 11.1941, the epithet there being written *Forrestii.*

A rather stiffly erect herb, growing to over 40 cm. high, evenly but not very densely pubescent with fine, loosely adpressed to spreading, basifixed, pale hairs. *Leaves* 7-12 cm. long with about 17 (13-21) leaflets. *Leaflets* oblong to narrow obovate, 14-20 mm. long, 5-9 mm. wide, glabrous above and glabrescent below, the hairs persisting chiefly along the vein and margins. *Stipules* deltoid to narrow deltoid, often acuminate from a rather broad base, 3-6 mm. long. *Racemes* up to 30 cm. in the Holotype, 8-20 cm. in others, with numerous flowers, about 30 in Holotype, occupying the greater part of this length, the peduncle with a pubescence like that of the stems. *Flowers* violet, mostly 9-10 (Holotype 10-11) mm. long on a dark-coloured, white-haired pedicel usually shorter than the subulate bract. *Calyx* tube 3-3.5 mm. long, the lanceolate teeth varying from 2 mm. to 5.5 mm. (5.5 mm. in the Holotype), equally pubescent inside and out (Fig. 8a), the bracteoles linear 0.5-1 mm. long. *Standard* usually 9-10 mm. long and broad but up to 12 mm. in some, including the Holotype, tapering gradually into the 1.5-3 mm. claw. No distinct calli are present but there are traces of the V-shaped thickening which is seen in the related species *S. Maccullochiana* and *S. ecallosa. Wings* 8-10 mm. long, paler than the other petals when dry, the claw 2-3 mm. *Keel* (Fig. 8b) usually 9 mm. long, 10 mm. in the Holotype, subacute at the apex, the claw 2.5-5 mm. without any pouches. *Ovary* (Fig. 8c) densely white pubescent, 2.5-3 mm. long at anthesis on a distinct and slender gynophore of 2-4 mm. *Style* (Fig. 8c) rather densely bearded all along, slender and tapering to the straight tip. *Fruit* (Fig. 8a) broad-elliptical in outline, turgid, the ends pointed, faintly reticulate under the pubescence about 7-10 mm. x 6-8 mm., the walls firm but thin, the suture intruded a little, the stipes at least 3 mm. long.

Herba recta ad 40 cm. alta pilis basifixis pallidis pubescens. Folia 7-12 cm. longa foliolis ca. 17 (13-21). Foliola oblonga ad angusto-obovata, 14-20 mm. x 5-9 mm., supra glabra, infra glabrescentia pilis margine persistentibus. Flores ad ca. 30, violacei, 9-11 cm. longi in pedicellis fuscis, albo-pilosis. Calycis tubus 3-3.5 mm. longus, dentes lanceolati 2-5.5 mm. Vexillum plerumque 9-10 mm. longum latumque ecallosum nisi linea V-specie ut *S. Maccullochiana* et *S. ecallosa.* Alae 8-10 mm. longae, quam petala cetera pallidiores in flore siccato. Carina 9-10 mm. longa, subacuta, sine sacculis. Ovarium dense albo-pubescens, anthese 2.5-3 mm. longum in gynophorio distincto gracili 2-4 mm. longo, stylo gracili apice recto. Legumen pubescens, sutura vix intrusa, ca. 7-10 mm. longum, 6-8 mm. latum.

DISTRIBUTION: See Map 1, derived from the Type and the following specimens:

Western Australia: Nickol R., A. Forrest, 1878; Fortescue R., A. Forrest, 1878; MEL. Between Uaro and Nanutarra, Ashburton R., Morrison, 3.10.1905; Lyndon Stn., Meadley 122, 14.7.1937; PERTH. Between Gascoyne R. and Cape Farquhar, Survey Exp. (1), 1883; Head of Menilyalya (now Minilya) R., J. Forrest, 1882 (*ter*); Gascoyne R., J. Forrest, 1882 (*ter*, dup. NSW *415*); do., Pollack, 1882 and a second sheet, undated; MEL. Winnemia, Gascoyne R., Gardner 6069, 20.9.1941; PERTH. Shark Bay, Jones 29; MEL.



Figs. 6a-c. *S. Maccullochiana* : 6a. pistil ; 6b. keel ; 6c. pod. Figs. 7a-c. *S. ecallosa* : 7a. pod ; 7b. keel ; 7c. pistil. Figs. 8a-c. *S. Forrestii* : 8a. pod and calyx ; 8b. keel ; 8c. pistil. (All x 3.5 except pods which are freehand drawings x 1.75.)

11. **S. stenodonta** F. Muell, Fragm. Phyt. Aust. 11: 70, Jan., 1879.

HOLOTYPE, by monotypy: Sherlock and Yule Rivers, W.A., J. Forrest, 1878; MEL. (Forrest's route on this journey was not far from the coast between these two rivers).

Plants ascending ("spreading-erect" *fide* Gardner 6303) with stems up to 65 cm. long, glabrous except for a few adpressed basifixed hairs on the youngest parts. *Leaves* about 5-8 cm. long, with 5-9 leaflets. *Leaflets* linear to narrow-oblong, the laterals 10-20 mm. x 1.5-2 mm., the terminal longer, up to 25 mm. x 4 mm. *Stipules* narrow deltoid, acuminate, 3-8 mm. long, green and glabrous. *Racemes* about 10 cm. long with 10-20 flowers occupying more than half the length, the peduncle glabrous like the rest of the plant. *Flower* "pale green or violet" *fide* Gardner, 8-10 mm. long on a slender, glabrous pedicel of 2-3 mm. in the axil of a minute bract 1 (as in the Holotype) to 2 mm. long. *Calyx* 4.5 (Holotype) to 6 mm. long, glabrous, with a pair of minute bracteoles at the base, the teeth narrow-deltoid, 2 (Holotype) to 3.5 mm. long. *Standard* 8-9 mm. long and broad, without any calli, the claw 1.5-2 mm. *Wings* obtuse, 7-8 mm. long, the claw 2 mm. *Keel* 8.5-9 mm. long, the claw 2.5 mm., rather broad but the tip subacute, without any pouches or folds. *Ovary* glabrous except for a thin line of adpressed hairs along the suture, 2-2.5 mm. long at anthesis, tapering gradually into a slender gynophore 1-2 mm. long. *Style* bearded evenly for most of its length, tapering into a very slender straight tip. *Fruit* seen only in immature condition, thin-walled, inflated, elliptical in outline, 10-12 mm. x 4-6 mm., the suture at this stage scarcely intruded but retaining the line of scattered, adpressed hairs; stipes scarcely elongated but equalling the calyx tube.

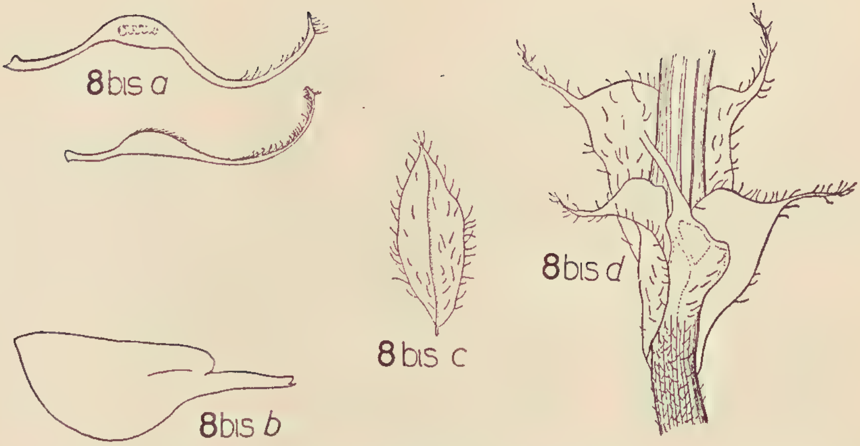
DISTRIBUTION: See Map 1, derived from the Type and the following specimen:

Western Australia: Python Pool, Mt. Herbert, Hammersley Ra., Gardner 6303, 16.10.1941; PERTH.

12. **S. decurrens** sp. nov.

HOLOTYPE: South of Marble Bar, W.A., on stony ground, Burbidge 1208, 14.6.1941; PERTH.

Erect herbs up to about 1 m. high, with a single (according to a note on the Type sheet) stout stem, striate and more or less densely clothed with soft, fine, spreading, basifixed hairs. *Leaves* crowded on the stem, about 10 cm. long with 11-17 leaflets. *Leaflets* (Fig. 8 *bis* c) narrow-elliptical, 25-30 mm. x 8-10 mm., ciliate with long, soft hairs, the upper surface glabrous, the lower glabrous or with a few scattered hairs. *Stipules* (Fig. 8 *bis* d) very large, leaf-like, markedly decurrent on the stem, when fully grown often 30-35 mm. along the longest edge and up to 10 mm. across the widest part, ciliate or pubescent on the inside like the leaflets. *Racemes* crowded with the leaves, especially near the apex of the stem, often 15-20 cm. long with 15-25 flowers occupying almost the whole length. *Flowers* apparently purple, 8-10 mm. long, on a pedicel of 2-3 mm. in the axil of a narrow, subulate bract of about the same length. *Calyx* tapering to the base, 5-6 mm. long with narrow, acute teeth 2-3 mm. long, glabrous outside or the teeth ciliate; bracteoles minute, shaped like the bracts. *Standard* ecallose, 9-11 mm. in length and breadth, the claw 1.5-3 mm. long. *Wings* 7.5-9 mm. with a claw 2-2.75 mm. long. *Keel* 8.5-9.5 mm. with a claw of 3-4 mm. and shallow folds or none. *Ovary* (Fig. 8 *bis* a) glabrous as in the Type or with longish hairs along the suture only, 2-2.5 mm. long on a distinct, slender gynophore of 2 mm. at anthesis. *Style* (Fig. 8 *bis* a) slender with a straight or very slightly incurved tip, evenly bearded all along and with a tuft or line of short hairs behind the stigma. Fruit inflated, 8-10 mm. x 6-8 mm., the pericarp thin-coriaceous and reticulate, the suture deeply intruded at maturity and the stipes elongating to about 3 mm. in length (very similar to the fruit of *S. Forrestii*, but glabrous).



Figs. 8*bis* a-d. *S. decurrens* : 8*bis* a. pistil ; 8*bis* b. keel ; 8*bis* c. leaflet ; 8*bis* d. stipules. (a, b. x 3.5 ; c, d. freehand x 0.75.)

Herbae rectae robustae caule unico striato dense pubescente pilis patentibus mollibus tenuibus. Folia coarctata 11-17 foliolis angusto-ellipticis, ciliatis, interdum infra pilis paucis. Stipulae maximae valide decurrentes, 30-35 mm. longae, 10 mm. latae, ciliatae ut foliola. Racemi coarctati, saepe 15-20 cm. longi, 15-25 floribus. Flores purpurei, 8-10 mm. longi in pedicello 2-3 mm. Calyx 5-6 mm. longus dentibus angustis 2-3 mm. longis glabris vel ciliatis. Vexillum escallosum, 9-11 mm. longum latumque. Alae 7.5-9 mm. longae. Carina 8.5-9.5 mm. longa, sine sacculis. Ovarium glabrum vel in sutura pubescente, anthese 2-2.5 mm. longum in gynophorio 2 mm. Stylus gracilis apice recto vel leviter incurvato post stigmam breviter barbato. Legumen subglobulum, inflatum, glabrum, pericarpio reticulato sutura intrusa maturitate, 8-10 mm. longum, 6-8 mm. diametro.

DISTRIBUTION: See Map 1, derived from the Type and the following specimens:—

Western Australia: North of Marble Bar, Burbidge 1059, 9.6.1941; PERTH. Between the Gascoyne and Fortescue Rivers, H.S. King, 1885; MEL.

S. PEDUNCULATA.

A species without obvious affinities, and in the small collections at present available, local in its distribution and with little variation. Its sparse pubescence of rather long hairs, few leaflets, broad standard, acute keel with woolly auricles and slender, straight-tipped style are distinguishing features.

13. S. **pedunculata** sp. nov.

HOLOTYPE and 6 HAPTOTYPES: Kennedy Ra., W.A., Gardner 6430, 9.1941 (on one sheet); PERTH.

A small more or less tufted, ascending herb or undershrub about 15-30 cm. high, clothed with a rather sparse pubescence of long, weak, white hairs, subbasifixed or asymmetrically medifixed, and with a number of pale green to straw-coloured, firm, slender, straight peduncles exceeding the leaves. *Leaves* 2-5 cm. long with 3-7 (usually 5) leaflets. *Leaflets* linear, narrow lanceolate or rarely lanceolate, the terminal distinctly longer than the laterals, glabrous above, more or less sparsely pubescent below at least around the margin; lateral leaflets mostly 8-10 mm. long, 1-1.5 mm. wide, the

terminal 15-20 mm. x 1.5-2.5 mm. *Stipules* linear, acuminate, 2-7 mm. long. *Racemes* few flowered, 5-20 cm. long roughly in proportion to size of plant, with 1-3 rather large, well spaced flowers. *Flowers* rose-violet (*fide* Gardner 6430), 10-12 mm. long but with the erect lamina of the standard making the flower higher (15 mm.) than long; pedicels slender, 1-2 mm. long, in the axil of a narrow acute bract of about the same length. *Calyx* glabrous outside but ciliate between the teeth, 4-8 mm. long, the tube 2-3 mm., as long as or shorter than the teeth, with a contracted, often minutely ribbed base, bearing a pair of minute bracteoles. *Standard* a little broader than long, 13-16 mm. x 11-14 mm., with two short, thickened, parallel, vertical ridges, sometimes resembling plate-like calli, or confluent above the short, 2 mm. claw. *Wings* 9-11 mm. long, the claw 2-3 mm. *Keel* (Fig. 9) acute or almost rostrate, densely to very sparsely clothed with loose, woolly hairs on the upper parts of the sides especially near the poorly developed auricles and along the edge (rather sparsely in the Holotype), 8-10 mm. long, the claw 3.5-4.5 mm. *Ovary* adpressed-pubescent with white hairs, about 5-6 mm. long at anthesis on a very short gynophore less than 1 mm. long. *Style* slender, bearded for most of its length, the tip straight. *Fruit* oblong-cylindrical, shortly pointed at both ends 15-30 mm. long, about 3 mm. in diameter, often slightly curved or falcate, the suture intruded to the base, the pericarp thin but firm, smooth, softly and rather sparsely pubescent with loosely adpressed hairs.

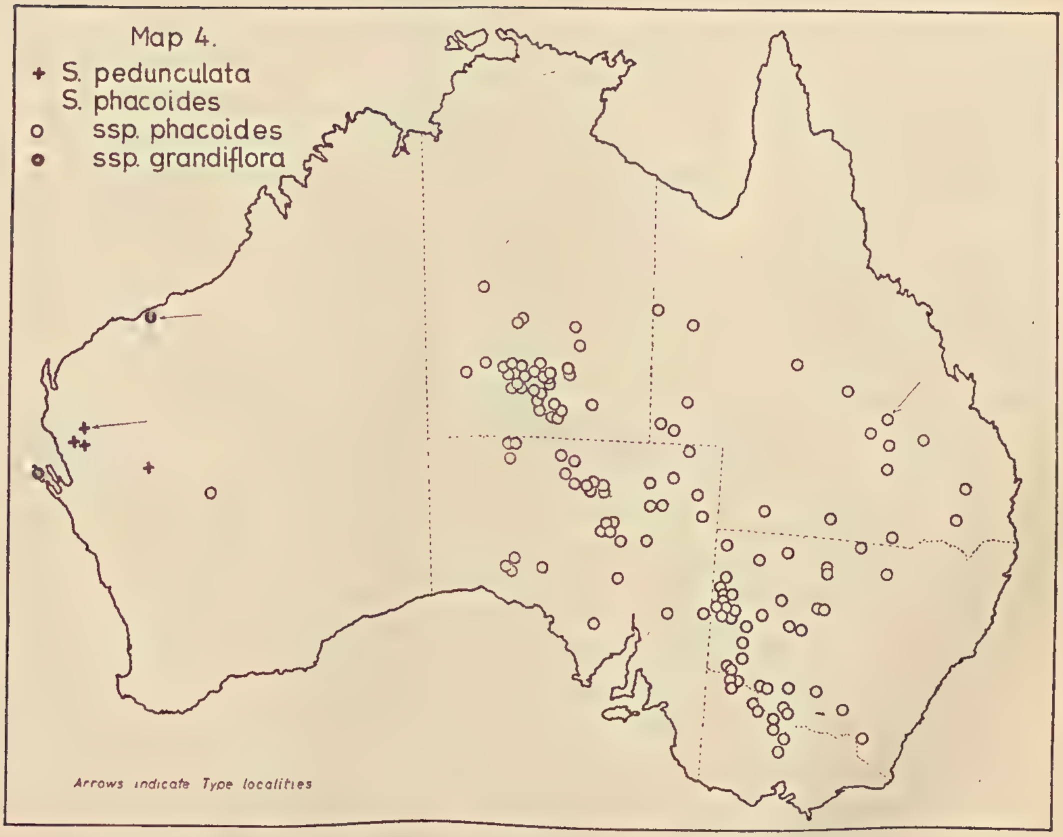
Herba caespitosa ascendens, sparsiuscule pubescens pilis longis tenuibus albis subbasifixis vel inaequaliter medifixis, pedunculis pluribus subviridibus vel stramineis, gracilibus rectis folia excedentibus. Folia 2-5 cm. longa foliolis 3-7 (plerumque 5). Foliola linearia, angusto-lanceolata infrequenter lanceolata, extrema quam lateralia valde longiora, supra glabra, infra sparsiuscule pubescenta certe in margine; lateralia circa 8-10 mm. longa, 1-1.5 mm. lata, extrema 15-20 mm. x 1.5-2.5 mm. Stipulae lineares, acuminatae, 2-7 mm. longae. Racemi floribus paucis, 1-3, majusculis, roseo-violaceis, 10-12 mm. longis, 15 mm. altis in pedicellis gracilibus 1-2 mm. longis bracteas aequantibus. Calyx exterior glaber, 4-8 mm. longus tubo quam dentes longiore vel breviore, 2-3 mm. longo bracteolis minutis. Vexillum 13-16 mm. longum, 11-14 mm.. latum, paullum longius quam latum, super unguem brevem lineis duabus crassis verticalibus paribus calli specie vel supra confluentibus. Alae 9-11 mm. longae ungue 2-3 mm. Carina acuta vel subrostellata, dense vel sparsissime in lateribus lanata, 8-10 mm. longa ungue 3.5-4.5 mm. Ovarium adpresso-albo-pubescens, anthese circa 5-6 mm. longum gynophorio brevissimo. Stylus gracilis, apice recto. Legumen oblongo-cylindricum breviter acutum, 15-30 mm. longum, circa 3 mm. diametro, sutura ad basem intrusa, pericarpio tenuiter coriaceo, sparsiuscule pubescens.

DISTRIBUTION: See Map 4, derived from the Types and the following specimens:—

Western Australia: Gascoyne R., J. Forrest, 1882; do., J. Forrest, without date, *sub S. lasiotropis* F. Muell. ined. near Mt. Hale, Upper Murchison R., Crossland, 1884 (*ter*); MEL.

S. PHACOIDES.

Like the last, this species shows no close affinities with other well defined species, although there is some similarity to the meditrichous ssp. *sericea* of *S. oroboides*. Unlike *S. pedunculata*, however, *S. phacoides* has a very wide distribution and shows some strong deviations from the Type which is also the commonest of the variants. This variation is particularly apparent in Central Australia.



14. S. phacoides Benth. in Mitch., Journal of an Expedition into the Interior of Tropical Australia: 363, 1848.

HOLOTYPE, by monotypy, not seen; examined and reported on by V. S. Summerhayes: "Sub-Tropical New Holland, Lieut.-Col. T. L. Mitchell, 1846, Bed of river 15 miles SW of Camp 29 (*recte* 49?) Sept. 1st, 1846, the only specimen, No. 586 *bis*"; K. This station is in the vicinity of what is now Mantuan Downs, Qd.

HOMOEOTYPES *fide* C. T. White in his note on the specimens "agrees with type, Kew 19.9.1939": Silverton, A. Morris 418, 2.10.1920 (dup. NSW *430*); Warrego R., SW Queensland, J. Shirley; BRI.

TYPE SUBSPECIES: *S. phacoides* ssp. *phacoides*.

From an examination of many specimens from the different Herbaria, the species *S. phacoides* in the above sense seems to comprise a population whose members exhibit a number of varying characters combined in different ways without constant correlation. While from a limited number of specimens several of these combinations might stand out as distinct entities, a larger collection shows so many combinations that, to be consistent, one must either continue to give each one a formal name, or else regard the whole population as a highly variable unit.

If the first alternative is adopted, the difficulty arises of choice of criterion on which the units are to be separated. A number of criteria are available (leaflet shape, size and number, flower size and number, pubescence, form of fruit, etc.), but none shows any reasonable degree of correlation with others. Thus several equally natural classifications could be made, and one specimen may exhibit two or more of the distinguishing varietal characters.

The second alternative seems the only reasonable one at the present stage of our knowledge. Thus all different phenotypes are treated as part of one highly variable species, and, while the variation of characters is noted, no formal names are given.

The Lectotype of var. *oocarpa* J. M. Black represents a group of specimens which achieves some degree of distinctness in the environs of the Macdonnell Range. It is a small plant, the leaves with few leaflets, a rather sparse, silky pubescence, short, broad fruits, and flowers in which the keel at least dries light in colour and appears to have been yellow. Most of these features are correlated in several specimens, some of which have a different, more delicate aspect than most specimens of *S. phacoides* ssp. *phacoides*, but each of them occurs also in other, different combinations. Some correlation between fruit and leaflet characters may, in fact, exist, but as many specimens do not bear fruits, and as the appearance of the leaflets seems to be altered by conditions of collection and growth, such a correlation does not make a satisfactory criterion for separation.

The variety *grandiflora* Benth. is maintained tentatively as ssp. *grandiflora*. Only one specimen has been found which can be grouped with its Type, but the two show the same combination of rather unusual characters.

Prostrate to ascending herbs or small undershrubs often rather densely pubescent with shiny medifixed hairs, but the hairs basifixed or subbasifixed in ssp. *grandiflora*. Leaves with 5-13 leaflets, pubescent on both sides, obtuse or acute; stipules narrow, racemes 1 to several-flowered, the flowers of medium size (often 9-10 mm. long), usually purple; standard with plate-like calli; keel obtuse with shallow folds; ovary subsessile, scarcely elongating in the fruit; style evenly bearded all along, slender with a straight tip; fruit ovoid to cylindrical with a deeply intruded suture and often spreading pubescence.

KEY TO THE SUBSPECIES.

Hairs of the pubescence medifixed .... a. ssp. *phacoides*.
Hairs of the pubescence basifixed or subbasifixed .... b. ssp. *grandiflora*.

a. ssp. **phacoides** (Benth. in Mitch. sensu orig.) comb. et stat. nov.

Holotype as for the species.

Absolute Synonym: S. phacoides Benth. in Mitch. sensu orig.

Equivalent Synonyms: *S. phacoides* var. *parviflora* Benth., Fl. Aust. **2**: 218, 1864. *Lectotype*: Between the Darling and Lachlan, N.S.W., Burkitt; MEL. Bentham's citation was "Darling and Lachlan Rivers, Neilson and others," but there is no appropriate specimen collected by Neilson at K or MEL.

S. phacoides var. *argyrophylla* J. M. Black, Fl. S. Aust.: 322, 1924. *Lectotype*: River Stevenson S.A., Herb. Tate, 2.8.1894; AD.

S. phacoides var. *oocarpa* J. M. Black, Trans. and Proc. Roy. Soc. S. Aust. **59**: 257, 1935. *Lectotype*: Mt. Hay, N.T., Cleland, 8.8.1932; JMB [*Haptotype* (probably *Isotype*); JBC].

S. uniflora J. M. Black, Trans. and Proc. Roy. Soc. S. Aust. **57**: 152, 1933. *Holotype* by monotypy, and two *Haptotypes*: Horsehoe Bend, Finke R., N.T., Ising, 8.1931; JMB.

A population of very diverse habit, from small suberect or spreading plants only 4 or 5 cm. high to large spreading or prostrate herbs with stout stems 60 cm. long. An average plant has the stems prostrate and about 15-20 cm. long. *Pubescence* of hairs attached more or less near the centre, often very asymmetrically, usually colourless and shiny, but sometimes white and dull, very variable in density and looseness. Hairs on the peduncle are often attached very close to one end, and some or all of them may be basifixed or laterally attached at the base. *Leaves* 2-15 cm. long roughly in proportion to the size of the plant, with 5-7 leaflets in small leaves and up to 13 in larger ones. A common size is about 6-7 cm. long, with 9 leaflets. *Leaflets* linear, narrow-oblong, -elliptical, -oblanceolate or -obovate, the apex acute, obtuse or strongly retuse, pubescent on both sides, often less densely above. *Stipules* not conspicuous, narrow-deltoid, acute or acuminate, 1-7 mm. long. *Racemes* varying with the size of plant from 3-4 cm. long with 1-3 flowers in small specimens to 20 cm. with several flowers in large ones. There are frequently only 3-6 flowers near the apex of the peduncle, but racemes of 8, 9 and 10 flowers also occur, while single flowers occur in plants of rather diverse habit. *Flowers* purple or occasionally white or yellow, roughly but not constantly proportional to the size of the plant, 9-10 mm. long in many specimens, in others up to 14 mm.; pedicel varying with flower size, 1.5-4 mm., usually longer than the subtending bract. *Calyx* (Fig. 10f, g) very variable in size and relative lengths of teeth and tube, 3-12 mm., the teeth 1-8 mm. long, and bracteoles minute to 3 mm. (often 5-8 mm. with teeth 2-4 mm. and bracteoles about 1 mm.), pubescent with usually rather long and more or less spreading hairs. *Standard* (Fig. 10a, b) usually about 9-10 mm. long and broad with a claw 1.5-3 mm., but as small as 7 mm. and in an exceptionally large flower 18 mm. with a claw 4 mm. long; small but distinct, usually plate-like calli present, rarely less strongly developed and tending to be punctate. *Wings* 7-13, usually 8-9 mm. with a claw 2-3 mm. long, the auricle sometimes ciliate. *Keel* obtuse, the free upper edge characteristically straight and perpendicular to the erect standard, with two folds, usually shallow, near the auricle. *Ovary* (Fig. 10c) densely pubescent with white hairs loosely adpressed, or with their ends spreading, often about 4-5 mm. long, the gynophore short and stout, less than 1 mm. long. *Style* (Fig. 10c) tapering to a very slender apex, evenly bearded all along, the tip straight. *Fruit* (Fig. 10 d, e) cylindrical, 10-30 mm. x 4 mm., or ovoid, 10-15 mm. x 7-12 mm., the apex broadly rounded, the suture deeply intruded, the pubescence often very spreading on mature pods.

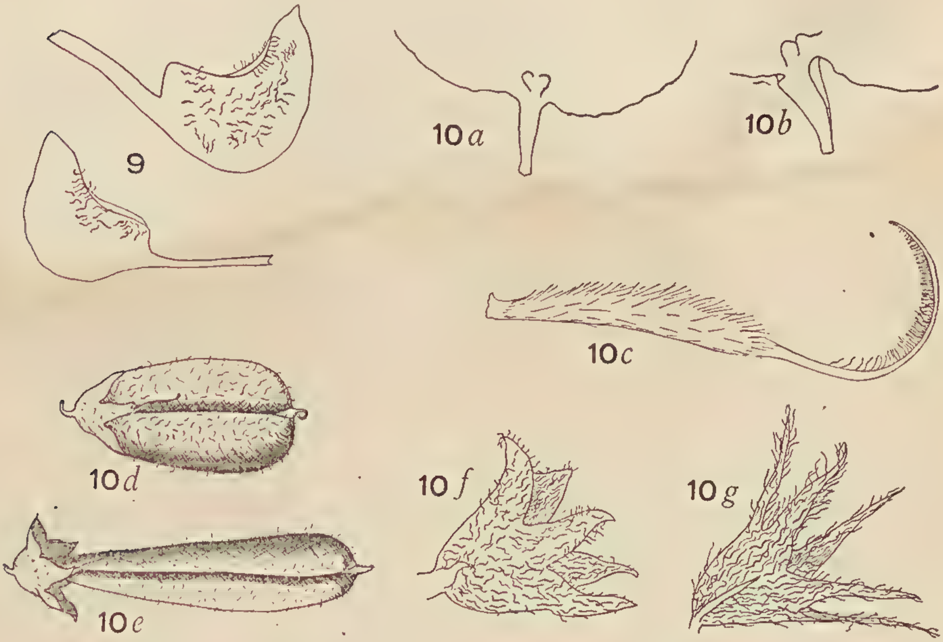


Fig. 9. *S. pedunculata* : keel with hairs on the sides. Figs. 10a-g. *S. phacoides* ssp. *phacoides* : 10a, b. base of standard with plate-like calli ; 10c. pistil ; 10d, e. ovoid and cylindrical forms of pod ; 10f, g. calyces with short and longer teeth. (All x 3.5 except pods which are x 1.75.)

Distribution: See Map 4, derived from the Type and representative localities among the following specimens:

Northern Territory: Cockatoo Ck., (Cleland), 22.8.1936, (dup. JMB); Near Coniston, (Cleland), 23.8.1936 (dup. JMB); Coniston (Cleland), 11.8.1936, (dup. JMB); Irukara Ck., tributary of Bundey R. (Cleland), 1.9.1930 (dup. JMB); MacDonald Downs, Fraser R. (Cleland), 28.8.1930 (dup. JMB); Mt. Liebig, (Cleland), 14.8.1932 (dup. JMB); JBC. Near the Macdonnell Ras., Schwarz, 1889; Brinkley's Bluff, Macdonnell Ra., Stuart; MEL. Redbank, Strehlow, 1922-23; AD. Redbank, 20 miles NE of Mt. Sonder, Strehlow, 1932; JMB. Mt. Sonder, Schwarz, 1886; MEL. Creek near Arltunga, (Cleland), 8.9.1930 (dup. JMB); JBC. Deering Ck., Horn Exped.? 1894 (dup. NSW *437*, coll. Watt); AD. Standley Chasm 40 miles W. of Alice Springs, Mrs. Dale, 7.7.1939, *438*; Alice Springs, Allen 611, 8.1922, *425*; NSW. Paddy's Hole, Watt (Horn Exp.) 1894 (dup. NSW. *439*); Glen Helen, Finke Pass; AD. Near Mt. Hay, (Cleland), 8.8.1932 (dup. JMB); Alice Springs, (Cleland), 27.5.1935; do., (Cleland), 23.8.1932 (dup. JMB); 10 miles S. of Alice Springs, (Cleland), 23.8.1932; Deep Well, (Cleland), 25.8.1931; Hermannsburg, (Cleland), 20.8.1929 (dup. JMB); JBC. do., Cleland, 28.8.1929; JMB. Tempe Downs S.A. (*sic*), Thornton, 1891; MEL. Hugh R., (Cleland), 20.8.1929; Near Hugh R., Macdonnell Ras., (Cleland), 19.8.1929; JBC. Henbury, Finke R., 21.8.1913; JMB. Finke R., Kempe, 1885; MEL. Near Camp 2, S.D.E., 6.6.1939; AD. Idracowra, S.A. White, 21.8.1913; JMB. Near Finke R., S.A. (now N.T.), R. E. Warburton, 1880 (*bis*); MEL. Horseshoe Bend, Finke R., Ising, 23.8.1931; do., Ising, 8.1931; do., S. A. White, 19.8.1913; JMB.

Queensland: Georgina R., C.A., Henry, 1889 (*bis.*); S. of Wills Creek, ? Howitts' Expedition; Between Bowen Downs and Mueller's Ra., Birch; Near the Alice R., Birch, 1884; Between the Barcoo and Roma, Birch, 1871 (bis); MEL. 30 miles S. of Bedourie, Blake 12277, 21.7.1936 (dup. NSW *419*); Chesterton, Blake 11114, 7.4.1936 (dup. NSW *418*); STB. 6 miles ESE of Camp 20, S.D.E., 28.6.1939; AD. Near Eyre's Creek, Kayser, 1877; MEL. Barakula, Young; BRI. Darling Downs, ? Lauterer 106; Between the Paroo and Grey Ra., Morton, 1881; MEL. Warrego R., S.W. Queensland, Shirley; BRI. Curriwillighi, Dalton 88; MEL.

New South Wales: Culgoa R., Webb, 9.1901, *434*; NSW. Grey Ra., Bauerlen 369; Wanaaring, Paroo, Malpas, 1870; Evelyn Ck., N. of Barrier Ra., King, 1887 (*bis*); Ballandool R., Walgett; Ballandool R., Looker; MEL. Warroo via Bourke, K. I. Morris 11, 17.10.35; BRI. Bourke, Würfel, 10.1884; MEL. Packsaddle, Brough and Beadle, 27.8.1939; SYD. Mt. Murchison, Bonney; Barrier Ra., Irvine, 1889; MEL. do., Collins, 9.1921; SYD. Southern Barrier Ra., Deane, 1893; Darling R., 8.1886; Wuttugoona, Cobar, Andrae 245, 1885; MEL. Near Cobar, Abrahams, 1910, *442*; Penrose, Silverton, Beadle, 1940, *416*; Silverton, A. Morris 418, 2.10.1920 (dup. BRI), *430*; do. in Penrose Park, Vickery, 25.8.1939, *427*; Mundie Mundie Plain, NW of Broken Hill, Andrews, 12.1919, *426*; Broken Hill, Andrews, 9.1918, *431*; do., Andrews, 12.1917, *429*; and 12.1919, *428*; about 30 miles E. of Broken Hill, Pidgeon and Vickery, 26.8.1939 (dup. SYD), *435*; NSW. Darling R., Urquhart, 1889; MEL. Long Dam (Broken Hill), A. Morris 1453, 19.9.1926 (dup. JMB), *420*; do., A. Morris 1454, 19.9.1926 (dup. JMB), *421*; NSW. Kars Stn. between Menindie and Broken Hill, A. Morris 746, 16.10.1921, *423*; NSW. Between the Lachlan and Darling Rs., Kuentz 2, 1885; Between the Darling and Lachlan, Burkitt, 1877; do., Burkitt (*bis*); Darling R., no. 34; Darling R., Dallachy and Goodwin; Lower Darling, Ford; MEL. Menindie, Beadle, 11.1939, *417*; NSW. Wentworth, Forde; do., Darling R., Minchin, 10.1887; Murray R. (det. "*S. lessertiifolia* DC. var. *tephrotricha* according to Bentham"); MEL. Zara via Hay, Officer, 2.1904, *422*; NSW. Murrumbidgee R., Mueller, 9.1878; Balranald, Lucas, 1883; MEL. do., per G.V.R.S., 23.9.1939, *424*; NSW. Brookong, Wagga Wagga, Crouch, 1873; MEL. Wakool, Smith, 11.1941, *4522*; ADW. Edwards R., Riverina, Sullivan, 1876; Tooma Rapids, Campbell; MEL.

Victoria: Mildura, Williamson (1), 10.1928; JMB. Lake Hattah, Kulkyne National Forest, NW Victoria, Willis, 7.9.1941; Swan Hill, Luehmann, 10.1890 (*bis*); do., Gummow; Murray R.; MEL. Gunbower, NW Victoria, Curtis, 10.1913; JMB. Campaspe R., Mueller, 10.1875; Sandhurst, Thom, 1884; MEL.

South Australia: Minnie Downs, Reese, 28.8.1926; Ernabella, Mrs. Brumby, 1937; do., (Cleland), 25.9.1945; do., (Cleland), 27.9.1945; JBC. Minnie Downs, Reese, 9.1926; JMB. River Stevenson, Herb. Tate, 2.8.1894 (dups. NSW *441*; JMB); AD. Pedirka, Hamilton R., Ising, 1.9.1931; JMB. Between the Musgrave and Everard Ras., (Cleland), 28.9.1945; JBC. Simpson Desert, Mountford, 8.1938; Todmorden Station, Alberga R., Andrew, 1.7.1920; JMB. Diamantina, Morgan, 8.1930 (dup. JMB); JBC. 5 miles E. of Macumba H.S., Ising, 3.9.1931; JMB. Neale's R., J. Macd. Stuart; MEL. Oodnadatta, Miss Staer, 2.1912; Staer, 11.1913;

JMB. Warrina, Helms E.E.E., 5.1891; do., Mrs. Richards, 1890; MEL. Between Innamincka and Kanowna, S.A. White, 4.10.1916 (or? 1910); JMB. Kopperamana, Cooper's Ck., Flierl, 1883; Cooper's Ck., Flierl 69, 1883; Tingatingarna nr. Lake Blanche, Mrs. Burkitt, 1885; MEL. William Ck., (Cleland), 10.9.1930; do., (Cleland), 18.8.1930 (dup. JMB); Irrapatana, (Cleland), 7.8.1931; JBC. do., Ising, 21.8.1931; JMB. Stuart's Ck., Basedow 41, Medical Relief Exp., 5.1920, *440*; NSW. Marree, George, 31.7.1931 (? dup. JMB), *1400*; ADW. N. of Fowler's Bay, Giles, 1875; MEL. Pidinga; do., Tietkins; AD. Wynbring, EW Railway, Ising, 20.9.1920; JMB. Arcoona, Murray 118, 16.9.1927 (dup. JMB); AD. Southern Cross Tank, Koonamore, 19.8.1930, *1397*; ADW. Beyond Mingary, A. Morris 640, 14.8.1921 (dup. "Boolcoomatta" JMB), *433*; NSW. Gawler Ra., Sullivan; MEL.

Western Australia: Between Wiluna and Sandstone, Bennett 131, 7.1941; PERTH.

Also the following, not mapped: Central Australia, Tate, 1894; Near Kubuntja, Strehlow, 1922-3; AD. Nine Mile Creek, A. Morris 1347, 13.9.1925 (dups. BRI, JMB "Broken Hill, 10.9.1925"), *432*; NSW. 60 miles NE of Camp II, N.T., Hill 286a and 284, 7.6.1911; From Nangavera to Yellowintchee, V.E.E.; Queensland, Bowman; Plywood Creek, Leichhardt's Second Exped. 159, Bunce, 7.?.1847; East Australia, Leichhardt; Murray Desert; Camps 25-35, Giles W. Aust. Exped., 1872; MEL.

ILLUSTRATION: Black in Trans. and Proc. Roy. Soc. S. Aust. **57** t. 9, 1933 (*sub S. uniflora*).

b. ssp. grandiflora (Benth.) stat. nov.

HOLOTYPE by monotypy: Nicol Bay and De Grey R., NW Australia, Ridley's Expedition, 12.1863; MEL (*Haptotype* not seen; K).

ABSOLUTE SYNONYM: *S. phacoides* var. *grandiflora* Benth., Fl. Aust. **2**: 218, 1864.

Differs from ssp. *phacoides* in the shorter, basally and subbasally attached hairs, short, closely adpressed and slightly flattened in the Type, more loosely adpressed and longer in the other specimen. *Flowers* in the type 14 mm. long, the pedicel 4 mm., twice as long as the deltoid bract. *Calyx* 6-7 mm., the teeth 2-4 mm. with bracteoles 1 mm. long. *Leaflets* mostly 15-20 mm. x 3-5 mm. broad, obtuse or shortly acute, pubescent on both sides (glabrescent above in Dirk Hartog Is. specimen). *Standard* 14 mm. long and broad, abruptly contracted into the narrow claw 3.5 mm. long. *Wings* 11 mm., the claw 3 mm. long, the auricles ciliate. *Keel* 13-14 mm., the claw 5 mm. long, with 2 slight folds above it, the apex obtuse and rather more incurved than in ssp. *phacoides*. *Ovary* densely adpressed-hoary with very short hairs, about 7 mm. long, the style as in ssp. *phacoides*. *Fruit* 30 mm. x 3-4 mm. in the only specimen, the suture intruded but not deeply (perhaps immature), the walls firm but thin.

DISTRIBUTION: See Map 4. Apart from the Holotype, this subspecies is known only from the following specimen: Dirk Hartog's Is., W.A., Bates, 1892; MEL.

THE KINGII GROUP.

S. viridis, S. dictyocarpa, S. Kingii and *S. laciniata.*

Very little is known of *S. dictyocarpa* and *S. laciniata,* but in several characters they conform to the pattern of the other two better-known species and are tentatively grouped with them. Of these two, *S. viridis* is a localised, scarcely varying species, while *S. Kingii* has a somewhat wider distribution and has differentiated into two subspecies. Concerning *S. Kingii,* a slight uncertainty has arisen from the fact that none of the specimens here accepted as belonging to the Type subspecies is an exact match for the Type which has longer stipules and calyx teeth than any other specimen, and differs also in having acute leaflets.

The shape of the calyx teeth (parallel-sided near their base), the ecallose or but slightly ridged standard, and the slender style with a straight or minutely inflexed or geniculate tip are common to all four species. All except *S. dictyocarpa* have large, leafy stipules.

Members of the group may be distinguished by the characters summarised in Table IV.

TABLE IV.

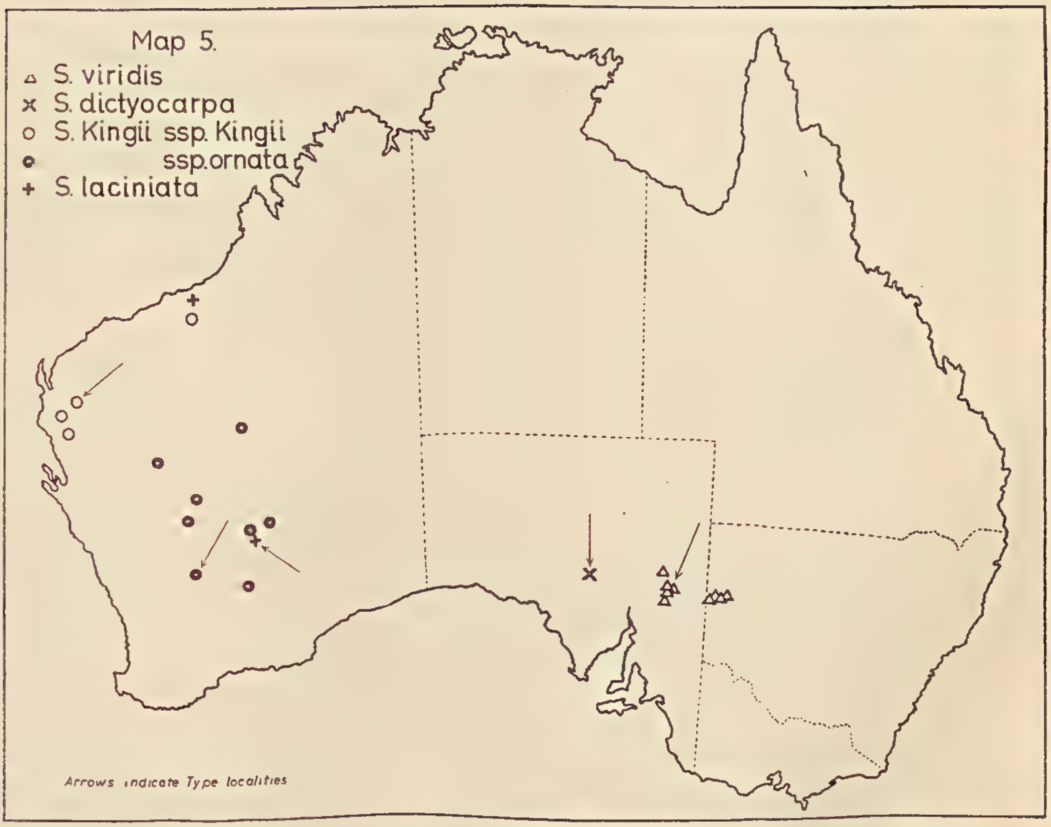
Species.	Stipules.	Keel.	Ovary.	Leaflets.	Bracteoles.	Fruit.
S. viridis	Broad, entire, almost glabrous inside and outside.	Broad, obtuse (fig. 11b).	Glabrous, hoary or pubescent.	Usually 9–11, obtuse.	Long (2 mm.)	Narrow-cylindrical, up to 35 mm. x 2–3 mm., reticulate or smooth.
S. Kingii ssp. *Kingii.*	Leafy, long, entire, usually glabrous on both sides.	Narrow, acute (fig. 12a).	Glabrous	Usually 5–7, obtuse except acute in the Type.	Small	*ca.* 30 mm. x 5 mm., reticulate or smooth (figs. 12b, c).
S. Kingii ssp. *ornata.*	Leafy, entire, pubescent inside.	do	Pubescent	Usually 5–9, obtuse.	do	Deeply honeycombed when mature (figs. 13a, b).
S. laciniata	Toothed, leafy, pubescent inside.	Rather narrow, subacute.	Glabrous	Usually 13–15, obtuse.	do	Not known.
S. dictyocarpa	Small, *ca.* 1 mm. long, sparsely ciliate.	Obtuse	do	3–7, obtuse	do	Deeply honeycombed, shape probably as in *S. Kingii.*

15. **S. viridis** J. M. Black, Trans. and Proc. Roy. Soc. S. Aust. 48: 225, 1924.

Holotype, by monotypy: Curnamona Stn., north of Yunta, S.A., Osborn, 22.8.1923; JMB, very imperfect.

Haptotypic Homoeotype: AD.

Prostrate or decumbent plants with stems usually 20-30 cm. long, glabrous except for the young parts, a few adpressed basifixed hairs persisting on the stipules, leaflets, peduncles and calyx teeth. *Leaves* 2.5-6 cm. long with 5-13 (usually 9-11) leaflets. *Leaflets* oblanceolate to narrow obovate, the apex rounded-truncate to slightly retuse, 4-13 mm. long, 2-7 mm. wide, commonly about 7 mm. x 3 mm., with a few hairs scattered along the margins and midrib below. *Stipules* broad, green, leafy, 3-7 mm. long, sparsely ciliate. *Raceme* 4-20 cm. long, the axis usually dark coloured, at least in the upper part, with a few scattered white hairs, with 5-10 flowers in the upper half or less. *Flower* bluish purple or purple, 9-11 mm. long on a short pedicel 1-2 mm. long with a few hairs, and subtended by a green sheathing bract about as long as the pedicel with a few marginal and external hairs. *Calyx* 5-6 mm. long, glabrous outside or the teeth ciliate; teeth 1.5-3 mm., pubescent inside; bracteoles about 2 mm. long similar in shape to the calyx teeth. *Standard* 8-12 mm. long and broad, the claw rather broad, 1.5-2 mm. long, without any calli. *Wings* 5-8 mm. long, the claw 1.5-3.5 mm. *Keel* broad and obtuse, 8.5-9 mm. x 5.5 mm., with two shallow folds



above the 3 mm. claw. *Ovary* closely adpressed-pubescent with light hairs, or hoary to almost glabrous (apparently glabrous or very slightly hoary in the Type), about 3-3.5 mm. long at anthesis on a gynophore up to 1 mm. long (Fig. 11a). *Style* (Fig. 11a) bearded chiefly in the upper part, the tip with a very minute geniculate segment. *Fruit* narrow-cylindrical, 20-35 mm. long, 2.5-3 mm. in diameter, sparsely hoary with short, adpressed hairs, the wall thin but firm, the suture deeply intruded.

DISTRIBUTION: See Map 5, derived from the Type and the following specimens:—

New South Wales: Stephen's Creek, Broken Hill district, A. Morris 1349, 24.10.1925 (dup. J.M.B.), *448*; do., A. Morris 1348, 9.1925 (dup. JMB), *bis*, *446*; *447*; do., A. Morris 747, 23.10.1921, *445*; NSW. Near Silverton, Irvine, 1889; do., Irvine, 8.1889; MEL.

South Australia: 52.2 miles from Arrowie, Andrewartha, 6.4.1938 (dups. JMB; AD ex ADW *2928*), *3566*; Erudina, Crocker 18.9.1939, *4577*; ADW. Curnamona, (Cleland), 3.12. 1930; JBC. Koonamore-Curnamona boundary, 26.8.1930, *1401*; ADW.

16. **S. dictyocarpa** J. M. Black, Trans. and Proc. Roy. Soc. S. Aust. 54: 60, 1930.

HOLOTYPE, by monotypy: Bitter Well, Coondambo, S.A., Cleland, 29.10.1928; JMB (*Haptotype* JBC).

Small ascending plants up to 6 cm. high, glabrous except for a few basifixed hairs fringing the bracts, calyx teeth and pedicels, or with a few scattered hairs on the surface of young leaflets. *Leaves* 1.5-3 cm. long with 3-7 leaflets. *Leaflets* narrow-elliptical, -oblong or -obovate, 5-9 mm. long, 2-4 mm. broad, the terminal leaflets longer, up to 13 mm. long. *Stipules* narrow-deltoid, acuminate, about 1 mm. long, sparsely ciliate. *Raceme* 2.5-4 cm. long with 2-6 flowers. *Flowers* drying purplish-blue, 8-9 mm. long, on a pedicel of about 2 mm. slightly exceeding the bract. *Calyx* 6 mm. long, glabrous or with a few hairs fringing the teeth, the teeth 3-3.5 mm. long with a fine but distinct median vein; bracteoles minute. *Standard* 10 mm. long and broad, the short, broad claw 2 mm. long with a pair of indistinct, minute folds or calli above it. *Wings* 8 mm. long, the claw 2.5 mm. *Keel* obtuse, 8.5 mm. long, the claw 3 mm., without pouches or folds. *Ovary* glabrous, about 3 mm. long at anthesis on a gynophore 1 mm. long. *Style* rather densely bearded in the upper part, somewhat flattened below, the tip straight or slightly inflexed. *Immature fruit,* with an uneven surface; in a sketch by Black on the Holotype sheet the fruit markedly reticulate, 10-12 mm. long, 2-5 mm. in diameter, the suture not (yet?) intruded.

DISTRIBUTION: Known only from the Type specimens. See Map 5.

17. S. Kingii F. Muell., Trans. and Proc. Roy. Soc. Vict. 23: 53, 1887.

TYPE SUBSPECIES: *S. Kingii* ssp. *Kingii.*

HOLOTYPE, by monotypy: Between the Gascoyne and Fortescue Rivers, W.A., King; MEL.

Prostrate or ascending plants with slender stems, glabrous or with a few loosely adpressed hairs, basifixed or laterally attached at the base; leaves with 5-9 leaflets; stipules large, entire, glabrous, or pubescent inside; raceme few-flowered, the flowers violet, rather small, the standard without calli, the keel acute, without pouches or folds; style tip straight or minutely inflexed, the ovary glabrous or adpressed pubescent and the pericarp smooth or strongly reticulate.

KEY TO THE SUBSPECIES.

Stipules usually glabrous; ovary glabrous or sometimes with a few hairs soon falling off; fruit smooth or reticulate, glabrous .... a. ssp. *Kingii*

Stipules pubescent inside; ovary pubescent; fruit strongly reticulate-ridged, sparsely adpressed pubescent .... b. ssp. *ornata.*

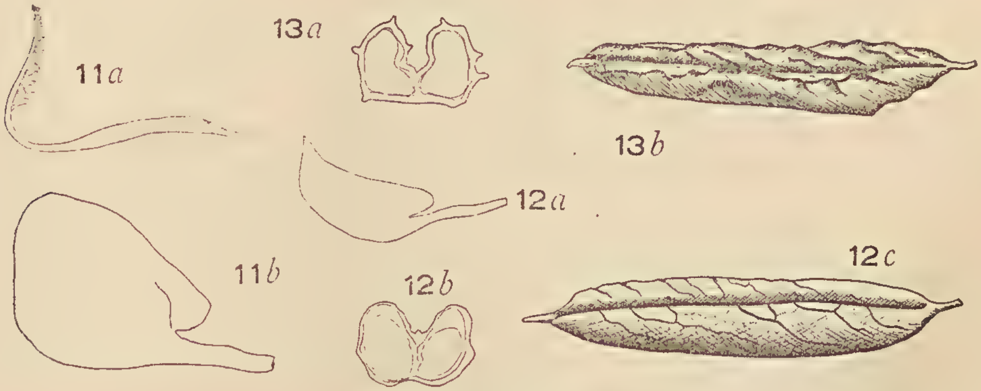
a. ssp. **Kingii** (F. Muell. sensu orig.) comb. et stat. nov.

HOLOTYPE: as for the species.

ABSOLUTE SYNONYM: *S. Kingii* F. Muell. sensu orig.

Prostrate or ascending plants, the stems slender, pale coloured, glabrous or with a few loosely adpressed white hairs basifixed or laterally attached at the base. *Leaves* 3-6 cm. long with 5-9 leaflets (5-7 in the Type). *Leaflets* narrow-elliptical to lanceolate or narrow-ovate, occasionally apiculate, 7-16 mm. x 2-6 mm. (elliptical, 8-13 mm. x 3-5 mm. in the Type), glabrous except for a few hairs around the margin and on the midrib. *Stipules* large, leaf-like, lanceolate, entire up to 2 cm. x 6 mm. in the Type, in others 5-11 mm. long (commonly 6-8 mm.), and 2-3 mm. broad, glabrous inside and out. *Raceme* 1.5-6 cm. long with 2-4 (in the Type, 3) flowers in the upper half or less, the peduncles almost filiform but firm. *Flowers* violet or violet-blue, 6-8 mm. (Type, 7 mm.) long, on a slender 1-2 mm. pedicel in the axil of a narrow, acute, sparsely ciliate bract about half as long as the pedicel. *Calyx* 3-6 mm. long (the Type, 6 mm., others 3-4 mm), with teeth 2.5 mm. long in the Type, only 1 mm. in other specimens, glabrous or with a few hairs around the teeth. *Bracteoles* minute, almost membranous, attached on the pedicel in the Type. *Standard* 7-9 mm. long and broad, the claw 2-3 mm. long, without any calli. *Wings* obtuse, 6.5-8 mm. long, the claw 2-3 mm. *Keel* (Fig. 12a) rostellate or at least with a small acute tip, 6-7 mm. long, the claw 2.5-3.5 mm., without pouches or folds. *Ovary* completely glabrous in the Type, 3-4 mm. long at anthesis on a 1.5 mm. gynophore; in other specimens the ovary white with scarcely discernible short, white hairs, which are lost as the fruit matures. *Style* with a very short beard chiefly in the upper half, the tip straight or very minutely inflexed. *Fruit* (Fig. 12b, c) absent from the Type; in others cylindrical with a deeply intruded suture, straight or slightly curved, 15-30 mm. long, 5 mm. in diameter, reticulate or almost smooth, glabrous.

DISTRIBUTION: See Map 5, derived from the Type and the following specimens:—
Western Australia: Mt. Edgar Station, De Grey R., Burbidge 1122, 11.6.1941; Wandagee, Minilya R., Gardner 3211, 29.8.1932 (*bis*); Wyndham Ra., Lower Gascoyne R., Gardner 6431, 9.1941; PERTH.



Figs. 11a, b. *S. viridis* : 11a. pistil with minutely geniculate style tip ; 11b. keel. Figs. 12a-c. *S. Kingii* ssp. *Kingii* : 12a keel ; 12b. transverse section of the pod ; 12c. pod. Figs. 13a, b. *S. Kingii* ssp. *ornata* : 13a. transverse section of the pod ; 13b. pod.

b. ssp. **ornata** ssp. nov.

HOLOTYPE: Between Kunnanoppin and Mt. Marshall, about long. 118°, lat. 31°, and Lake Barlee (long. 119°-120°, lat. 29°-30°), W.A., Fitzgerald and Fraser (through Grasby), Winter-Spring 1919, *449*; NSW.

PARATYPES: (1) Coolgardie, W.A., Helms, 7.1899; PERTH; (2) Malcolm, W.A., 8.1907; MEL.

Differs from ssp. *Kingii* in having a pubescent ovary and fruit, the latter distinctly and irregularly ridged, and stipules which are pubescent inside. Prostrate or ascending small plants with stems radiating from a central tap root. *Leaves* 1.5-3 cm. long, the *leaflets* obovate to very broad-obovate, scarcely notched but often with a small point at the obtuse apex, 5-10 mm. x 3-6 mm. *Stipules* evenly pubescent inside, 4-7 mm. long, 3-4 mm. broad. *Racemes* 3-4 cm. long with 1-6 flowers (3 in the Holotype) near the apex. *Flowers* 5-6 mm. long, the bracteoles attached at the base of the calyx. *Ovary* rather densely pubescent with short adpressed white hairs, becoming ridged in the early fruiting stage. *Fruit* (Fig. 13 a, b) very angular in transverse section due to irregular, sharp ridges developed chiefly from reticulating longitudinal veins, scantily adpressed pubescent, 2 cm. long, 4 mm. in diameter, the intruded suture reaching almost to the base.

Ab ssp. *Kingii* in ovario et legumine plerumque pubescente, in legumine valde et enorme inaequale, et in stipulis intra pubescentibus differt. *Foliola* obovata ad latissimo-obovata, vix retusa saepe mucronulata apice obtusa, 5-10 mm. longa, 3-6 mm. lata. *Stipulae* intra aequaliter pubescentes, 4-7 mm. longae, 3-4 mm. latae. *Ovarium* densiuscule pubescente pilis adpressis brevibus candidis, mox in aequalante post fertilisatione.

DISTRIBUTION: See Map 5, derived from the Types and the following specimens:—

Western Australia: Parker's Ra., Merrill, 1892; Upper Murchison R., Tyson, 1892; MEL. Lake Mason Stn., Bennett, 7.1941; Anketell, Muir's Survey, 18.8.1901; PERTH. Laverton, Maiden, 9.1909, *450*; NSW.

18. S. laciniata sp. nov.

HOLOTYPE: Dingo Creek, Malcolm, W.A., Gardner, 16.9.1927; PERTH.

Procumbent, fairly large herb, with stems about 25-30 cm. long in the Holotype. *Leaves* 4.5-7 cm. long including the short petiole 0.7-1.5 cm. long with 7-15 leaflets. *Leaflets* narrow-obovote to retuse, usually with a small point in the notch, 5-7 mm. long, 3-5.5 mm. wide, glabrous on both sides in all but the youngest stages when a few minute marginal hairs are present. *Stipules* leafy, the lower ones laciniate with lobes about 2 mm. long, the upper ones less deeply cut, rather sparsely short-pubescent inside, glabrous outside. *Racemes* up to 15 cm. long with 8 to about 20 flowers in the upper half or one-third, the peduncles glabrous or sprinkled with a few minute basifixed white hairs. *Flowers* purple, drying fawn or paler purple, 6-7 mm. long, on pedicels of about 2 mm. subtended by bracts of nearly equal length; bracts sparsely ciliate; pedicels hirsute with similar minute, white or dark hairs; bracteoles minute, ciliate like the bracts, attached to the calyx-base. *Calyx* glabrous outside and inside or with a very few hairs along the margin as on the bracts, 2.5-3 mm. long, the deltoid teeth barely 1 mm. *Standard* 7 mm. long, 5 mm. broad, the claw 2 mm. long; calli absent. *Wings* obtuse, 5 mm. long, the claw 1.75 mm. *Keel* somewhat acute, slightly incurved, 5-5.5 mm. long, the claw 2.5 mm. with 2 very small folds near the auricles. *Ovary* glabrous or with a few hairs along the suture, with about 8-12 ovules, the style shortly bearded for most of its length, slender, the tip straight. *Fruit* not known.

Herba procumbens majuscula, *foliis* 4.5-7 cm. longis foliolis 7-15. *Foliola* angusto-obovata vel retusa, 5-7 mm. longa, 3-5.5 mm. lata, glabra. *Stipulae* foliosae, laciniatae lobis ad 2 mm. longis, intus sparse brevi-pubescentes, extra glabrae. *Racemi* ad 15 cm. longi 8-20 floribus purpureis 6-7 mm. longis in pedicellis circa 2 mm. longis circiter tam aequilongis quam bractea. *Calyx* glaber vel pilis paucis dentium margine, 2.5-3 mm. longum, dentibus vix 1 mm. longis. *Vexillum* 7 mm. longum, 5 mm. latum, ungue 2 mm. longo, sine callis. *Alae* 5 mm. longae, ungue 1.75 mm. longo. *Carina* acutiuscula, circa 5 mm. longa, ungue 2.5 mm., et rugis duabus minimis. *Ovarium* glabrum vel pilis paucissimis in sutura. *Stylus* apice rectus. *Legumen* ignotum.

DISTRIBUTION: See Map 5. Known only from the Holotype specimen and perhaps the following:—

Western Australia: Pardoo Station, N. of De Grey R., Burbidge 1523, 24.7.1941; PERTH. This specimen is very similar to *S. laciniata* but differs in having fewer (9-11) leaflets, larger flowers (11-13 mm. long), standard with distinct plate-like to horizontal calli and longer (11 mm.) than broad (9 mm.), and bears cylindrical, reticulate, deeply grooved, often curved fruits, 18-25 mm. long and sparsely hoary after a more densely hoary ovary.

S. ROSTELLATA.

Although in superficial appearance *S. rostellata* is similar to *S. Oliveri* and to some specimens of *S. microphylla*, its detailed structure is different from that of those groups, and indeed from that of any other species. The small petals and particularly the narrowly obtuse keel and the peculiar style tip are its distinguishing features. The style seems almost to lack the beard which is characteristic of the genus, as does *S. Oliveri*, but the straight, inflexed or upturned terminal segment is quite distinct from the coiled tip of *S. Oliveri*.

19. **S. rostellata** sp. nov.

HOLOTYPE: Mt. Magnet, W.A., Gardner 2232, 11.7.1931; PERTH.

PARATYPE: Lawlers, W.A., ex herb. W. V. Fitzgerald, 7.1899, *793;* NSW.

Small prostrate herbs with a number of thin stems up to 27 cm. long, radiating at ground level from the central stock, sparsely hoary with short scattered, white, adpressed, basifixed hairs. *Leaves* 1.5-3.5 cm. long with a varying number of leaflets, 9-11 in the Holotype, 15-17 in others. *Leaflets* oblanceolate to almost broad-obovate, the apex retuse, truncate or obtuse, about 2-5 mm. long, 1.5-3 mm. broad, glabrous above, with a few scattered hairs below especially along the vein and margin; leaflets uniform in length, the terminal one a very little longer than the others. *Stipules* very small, deltoid, obtuse, sparsely ciliate with short hairs, about 1-2 mm. long. *Raceme* from 1 cm. long in very small plants to 10 cm. in larger ones, with flowers varying proportionately from 1-6 in the upper part, the peduncle almost capillary, hoary with scattered hairs becoming denser towards the apex. *Flower* purple-violet (*fide* Gardner 2232) 6 (in the Type and usually) to 9 mm. long, on a short pedicel about 1.5 mm. long in the axil of a rather broad bract of about the same length. *Calyx* (Fig. 17c) 2.5-3 mm. long, sparsely clothed with short, adpressed, dark (in specimens so far collected) hairs, the deltoid teeth 1-1.5 mm. long, the minute bracteoles broad like the bracts, 0.5-1 mm. long. *Standard* 4.5-8 mm. long and broad, or in large flowers expanded to a width of 10 mm., the claw 1.5-2 mm. long, with two more or less thickened divergent lines above the claw. *Wings* 4.5-6.5 mm. long, the claw 1.5-2 mm., the apex broadly rounded. *Keel* (Fig. 17c) 5-5.5 mm. long, the claw 2.5-3 mm. the apex tapered shortly into a small, obtuse beak; pouches or folds absent. *Ovary* glabrous, 2-3 mm. long at anthesis on a slender gynophore 0.5 mm. or less in length. *Style* curved erect, or recurved over the ovary, with a beard of very short hairs chiefly in the apical part and sometimes lacking in mature flowers, the tip (Fig. 17a) with an inflexed or incurved to upturned segment, slightly flattened and sometimes slightly twisted. *Fruit* (Fig. 17b) seen only in an immature stage but showing indications of strong, sharp, undulate longitudinal ridges with shorter transverse ridges running from them, and with the gynophore increased to 1 mm. in length; suture intrusion indeterminate.*

Herbae parvae procumbentes sparse incanae pilis brevibus albis adpressis basifixis. In folio foliola 9-15, oblanceolata vel fere lato-obovata, apice retuso, truncatove obtusove, extrema tam aequilonga quam lateralia vel paullo longiora. Racemi 1-10 cm. longi floribus 1-6 prope apicem pedunculorum subcapillarium. Flores purpurei 6-9 mm. longi in pedicellis 1.5 mm. longis circiter tam longis quam bracteae latiusculae. Calyx 2.5-9 mm. longus sparse pubescens pilis brevibus adpressis fuscis, dentibus 1-1.5 mm. longis, bracteolis minutis ad bracteas similibus, 0.5-1 mm. longis. Vexillum 4.5-8 mm. in longitudine latitudineque, lineis duabus crassiusculis divergentibus super unguem 1.5-2 mm. longum. Alae 4.5-6.5 mm. longae, ungue 1.5-2 mm. Carina 5-5.5 mm. longa, ungue 2.5-3 mm. apice anguste obtuso-rostellato sine sacculis. Ovarium glabrum anthese 2-3 mm. longum in gynophorio gracili 0.5 mm. longo. Stylus brevissime barbatus, glabrescens, apice inflexo incurvatove vel recurvato. Legumen immaturum jam valde undulatum, gynophorio elongato ad 1 mm.*

DISTRIBUTION: See Map 6, derived from the Types and the following specimens:—

Western Australia: Greenough R., Grey, 1869; MEL. Glenorn Station, Malcolm, Burbidge 158, 8.1938; PERTH. Greenough, Jones, 1879; Sources of the Swan R., Sewell, 1889; MEL.

Also, not located: Lakeside, ex herb. W. V. Fitzgerald, 9.1898, *792*; NSW.

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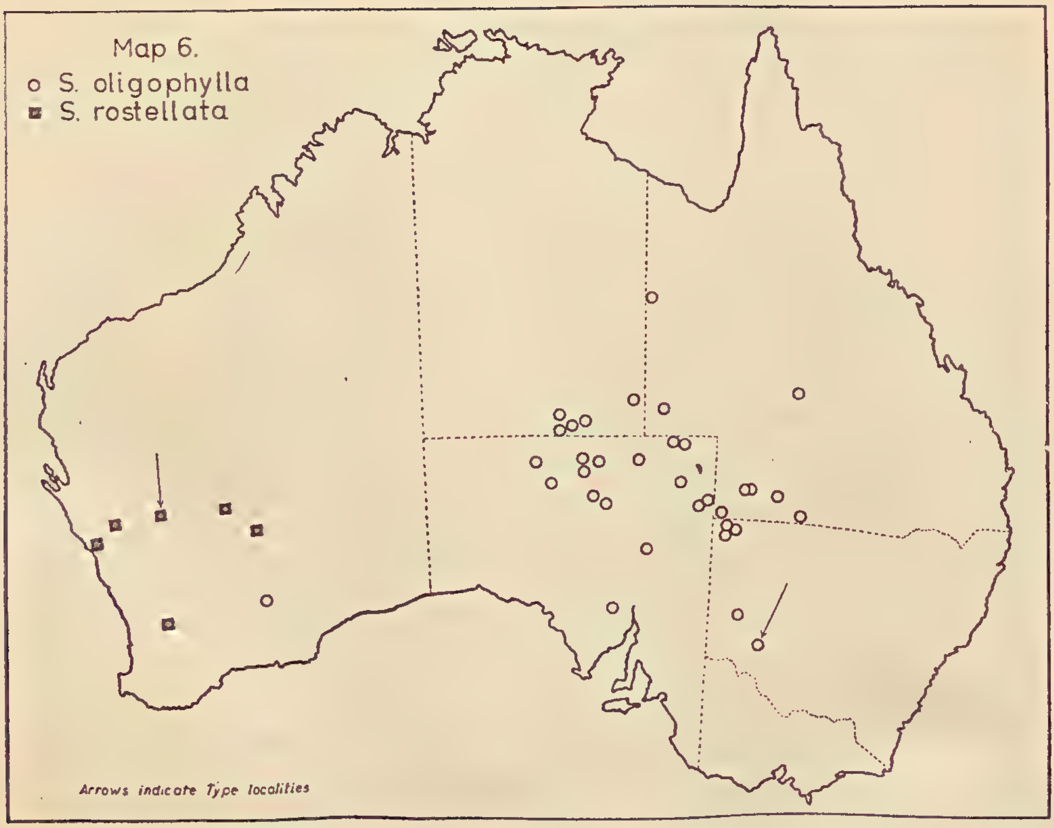
*Mature fruits have been examined subsequently. They are subsessile, 5-9 mm. long, 4-6 mm. broad, with the suture intruded to the base in a broad groove, the pericarp with strong reticulating ridges and hollows, like that in *S. occidentalis* (Fig. 30b).



S. OLIGOPHYLLA.

The affinities of this species are not altogether clear, but are possibly with *S. Burkei* and *S. flavicarinata* of the CANESCENS Group. It shows distinct resemblances to these species in its leaflet shape and number and in the shape of its petals, particularly the long-clawed keel (cf. Figs. 16b, 42c, 45d, 46c). Its pubescence and style tip however, are not similar to those seen in the CANESCENS Group, and this species is tentatively placed here until its relationships are better understood.

20. **S. oligophylla** F. Muell. ex Benth., Fl. Austr. 2: 219, 1864.

Lectotype: Darling R., N.S.W., 29.9.1860, Victorian Expedition; MEL.

Lectoparatypes: (1) Towards Spencer's Gulf, S.A., Warburton; (2) Cooper's R., S.A.-Qd., Gregory; (3) NW interior of S.A., J. M. Stuart; MEL.

Equivalent Synonym: *S. concinna* F. M. Bailey, Qd. Agric. J. **25**: 286, 1910. *Holotype*, by monotypy: Georgina R., Qd., Bick, 11.1910; BRI.

Small ascending or prostrate plants with stems 8 to over 30 cm. long, sparsely clothed with scattered, slightly flattened, white adpressed hairs basifixed or subbasally attached. *Leaves* 1-3 cm. long, of 3-9, usually 5 or 7, leaflets. *Leaflets* narrow-obovate to obovate with the apex obtuse or almost truncate with a small point, 4-11 mm. long, usually 6-9 mm., 2-5.5 mm. broad, the terminal leaflet a little longer than the laterals, glabrous above, sprinkled with a few hairs on the underside especially near the margins. *Stipules* small, narrow-deltoid, acuminate, 1-3 mm. long. *Racemes*

2-11 cm. often about 7 cm. long, with 3-8 flowers in the upper one-third or one-half. *Flower* purple or crimson, 7-9 mm. long, on a pedicel 1-2 mm. long, equalling the linear, acute subtending bract. *Calyx* (Fig. 16c) 5-6.5 mm. long (Lectotype 6 mm.), almost glabrous except along the veins and inside the teeth, the tube 1.5-2 mm. long, the subulate teeth varying from 3.5-5 mm. (Lectotype 4.5 mm.), and with a pair of linear, acute bracteoles 0.5-2 mm. long (Lectotype 0.6 mm.) attached at the base of the calyx. *Standard* 7-8 mm. long and broad, the claw relatively short (1-1.5 mm.) and broad, the lamina slightly thickened just above the claw but without distinct calli. *Wings* usually 6-6.5 mm. long (but only 4 mm. in Lectotype) the claw only 1-1.5 mm. the auricle narrow, oblong. *Keel* (Fig. 16b) 6.5 mm. as in the Lectotype etc., to 7.5 mm. long with a long claw (3.5-4.5 mm.), obtuse and without pouches or folds. *Ovary* (Fig. 16a) adpressed-pubescent with fine hairs, 2.5-3 mm. long at anthesis, the gynophore 0.5 mm. *Style* (Fig. 16a) curved erect, the base slightly flattened and usually darker in colour, the beard extending right along, the tip straight or minutely inflexed. *Fruit* (*fide* J. M. Black) pubescent, oblong, about 12 mm. long.

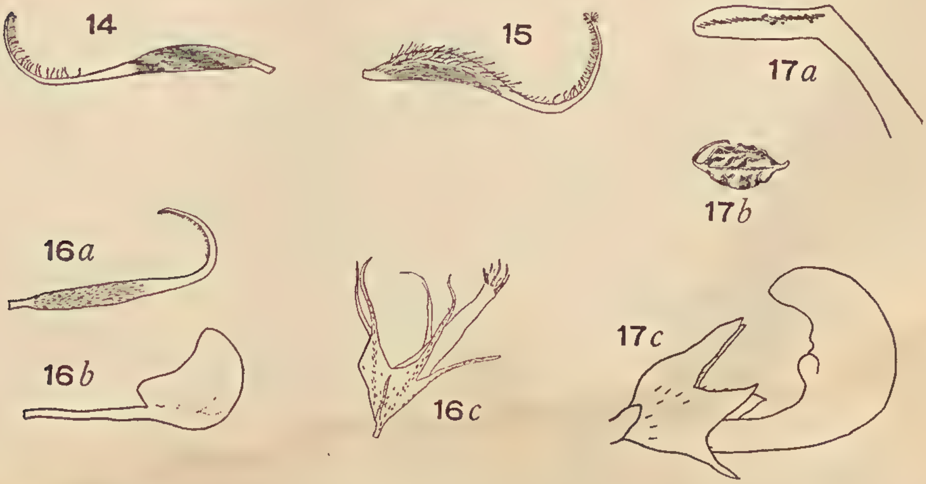


Fig. 14. *S. lessertiifolia* : pistil. Fig. 15. *S. tephrotricha* : pistil with tuft behind the stigma. Figs. 16a-c. *S. oligophylla* : 16a. pistil ; 16b. keel with long claw ; 16c. calyx with subulate teeth and hairs along the veins. Figs. 17a-c. *S. rostellata* : 17a. style tip ; 17b. pod (immature) ; 17c. calyx and narrow keel. (All x 3.5 except 17a which is x 22 and 17c which is x 7.)

Distribution: See Map 6, derived from the Types and the following specimens:—

Northern Territory: Alice Ck., Tate, Horn Exp., 23.7.1894; AD. R. Finke, Mountford, 8.1938; JMB. 1 mile N. of Andado H.S., S.D.E., 30.5.1939; Sandy Watercourse, Charlotte Waters, S.D.E., 1939; AD. Coglin Ck., Ising, 26.8.1931; JMB.

Queensland: Georgina R., Bick, 9-10.1910; Isisford, Parkinson, 8.1924: Near Nockatunga, MacGillivray 994, 4.9.1923; BRI. Nockatunga Stn., Blake 11817, 27.6.1936; STB. Near the Mulligan R., Cornish, 1885; Yappunyah near Thargomindah, Mrs. Spencer, 4.1885; MEL. Caiwarro near Eulo, K. I. Morris 8, 30.8.1938; BRI. Queensland border N. and a little W. of Broken Hill, MacGillivray, 4.1917, *459;* NSW. Queensland border, Grey Ras., Bauerlen 362; MEL.

New South Wales: Tibooburra, McClure, 2.1915, *458;* Mt. Sturt Stn., A. Morris 749, 27.9.1921, *457;* NSW. Lake Cawndilla near Menindie, MacGillivray per A. Morris 677, 2.9.1921 (dup. JMB), *456;* NSW.

South Australia: Flood Plain Pandie Pandie, (Cleland), 20.8.1934 (dup. JMB); JBC. Minnie Downs near Warburton R., Reese, Summer 1924; JMB. Metrilligan, Tate, 8.5.1894;

AD. Wantriapella (Wantapella), Swamp near Musgrave Ras., S.A.White, 18.7.1914; Oodnadatta on flooded flats of Neale's R., Ising, 7.9.1931; Simpson Desert, Mountford, 8.1938; JMB. From the Finke to Lake Eyre, Giles, 7.1872; Warrina, Richards, 1890; MEL. Strzelecki Ck., SW of Innamincka, S.A.White, 27.9.1916; JMB. Towards Lake Eyre, Giles, 1872; Victorian Expedition, Beckler, 8.2.(1861); MEL. Mundowdna, Farina, M. Murray. 8.1883; AD.

Western Australia: Between Dundas Hills and L. Lefroy, Batt, 1893; MEL.

Also, not mapped: Red Mulga Creek, Tate, 1894; AD. Howitt's Expedition; MEL.

ILLUSTRATION: F. M. Bailey, Compr. Cat. Queensland Pl.: 134 fig. 111 *bis*, 1909-13 (sub *S. concinna*); and (same plate) Qd. Agric. J. **25** t.28, 1910 (sub *S. concinna*).

THE LESSERTIIFOLIA GROUP.

S. lessertiifolia and *S. tephrotricha.*

As represented in collections to date, this group constitutes an *Artenkreis* of two species, the former with a wider, coastal area of occurrence and greater variation than the local, interior and fairly constant second species. The nature of the variation in *S. lessertiifolia,* however, is such that it is not impossible that further collections from the interior part of its range may reveal a connection between the two species.

Within *S. lessertiifolia* there is some distinction between the extreme forms of the variation, but no complete discontinuity. The differences lie in characters of hair fixation (from basal through subbasal to submedian), and density of pubescence (from moderately dense with long hairs, to sparse with short hairs). Basifixed hairs are generally longer and silky, and constitute a dense pubescence, while short, distant hairs are generally subbasifixed or medifixed, but this correlation is not constant. From the redescription by Summerhayes, it seems possible that the Holotype is one of a number of specimens examined which combine basal fixation with short hairs and rather sparse pubescence. There is no apparent geographic or ecological factor correlated with this variation.

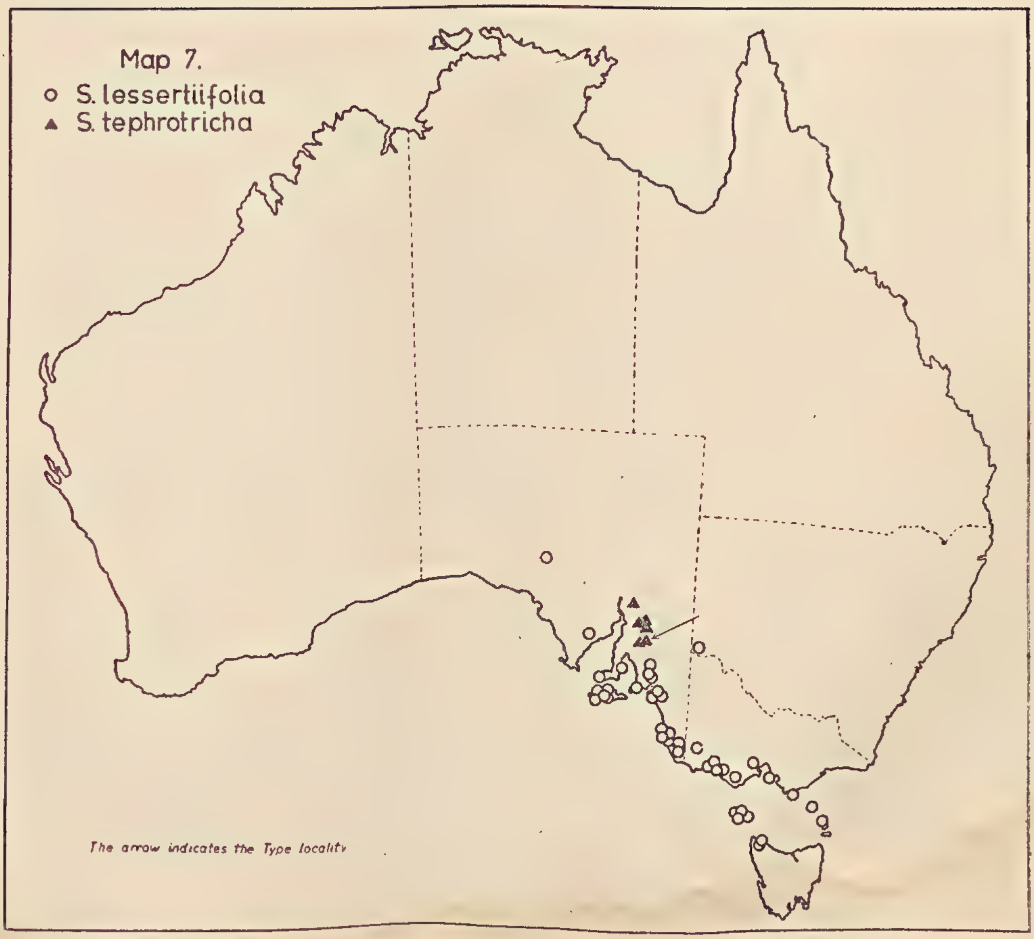
Because the proportion of intermediate specimens is high (about 27 per cent. of the total number) and because the differences concern the pubescence only, the variations are not distinguished by formal names.

In *S. tephrotricha* we find a different combination of similar features, namely a dense pubescence of long, medifixed hairs. It is further distinguished by having leaflets pubescent on both sides, and a tuft of hairs behind the inflexed style tip. The relationship should be borne in mind, however, as further collections of *S. tephrotricha,* at present poorly represented in Herbaria, may prove this discontinuity to be apparent only.

The differences between the species are summarised in Table V.

TABLE V.

Species.	Pubescence.	Leaflets.	Style Tip.
S. lessertiifolia	Dense to sparse, if dense the hairs basifixed, if sparser, the hairs short, fine, more or less medifixed.	Glabrous above ...	Not tufted (fig. 14).
S. tephrotricha	Dense, of rather long medifixed hairs	Pubescent on both sides.	Tufted behind the stigma (fig. 15).



21. **S. lessertiifolia** DC., Ann. Sci. Nat. Ser. 1, 4: 99, 1825. Descr. ampl. V. S. Summerhayes, Kew Bull. 1926: 239.

Holotype, not seen: "Nouvelle Holland, côté merid. Mus: de Paris 1821" (Herb. Delessert); K.

Synonymy: The following are synonyms *fide* Index Kewensis, but neither specimens descriptions, nor illustrations have been available to me: *S. Frobelii* Regel, Gartenfl. **3**: 178, 1854; *S. astragalifolia* Hort. ex G. Don, Loud. Hort. Brit.: 305, 1830.

Erect ascending herbs sometimes with rather robust stems 30cm. long or more, densely to sparsely pubescent with adpressed, basifixed silky hairs or shorter, finer hairs subbasally or submedially attached. *Leaves* 4-11 cm. long, mostly 6-9 cm., with 13-19 leaflets. *Leaflets* elliptical to narrow-elliptical, obtuse, emarginate or almost acute, 5-20 (mostly 9-18) mm. long and 2-9 (mostly 4-7) mm. broad, densely or sparsely adpressed-villous, glabrous above. *Stipules* deltoid, the apex rounded, 2-7 mm. long, usually with some hairs outside, glabrous inside. *Raceme* 10-25 cm. long, with 10 to more than 20 flowers occupying about half of this length; pubescence of peduncle corresponding in density with that of the leaves. *Flower* purplish 8-10 mm. long, on a dark-haired pedicel of 2-4 mm. similar in colour and length to the subtending bract. Calyx characteristically dark brown in colour and pubescence, rarely white-haired, 3.5-5 mm. long with teeth 1-2.5 mm., usually shorter than the tube; bracteoles 1 mm. long or less. *Standard* mostly a little broader than long, up to 13 mm. x 12 mm., the claw to 3 mm. long, without any calli. *Wings* 5-9 mm. long, the claw 2-3.5 mm. the apex broadly rounded. *Keel* obtuse, 7-10 mm. long, the claw 2.5-3 mm. with or without a pair of shallow folds above it. *Ovary* (Fig. 14) adpressed-pubescent, the hairs white at first, later dark brown, 3-4 mm. long on a very short (0.5 mm. or less) gynophore at anthesis. *Style* (Fig. 14) slender, bearded chiefly in the upper half, the tip straight or minutely inflexed. *Fruit* subsessile, hoary with adpressed hairs, 15-30 mm. long, 5-8 mm. in diameter, inflated but with a firm pericarp, the suture not intruded until, apparently, dehiscence has commenced.

DISTRIBUTION: See Map 7, derived from representative localities among the following specimens:—

New South Wales: Near Lake Bonney, N.S.W. (*sic*), Wehl, 1890; MEL.

Victoria: Wando Vale, Robertson, *465*; NSW. You Yangs, Mulder, 10.1893; MEL. Port Fairy, Whan, *462*; do., Williamson, 10.1901, *472*; do., Williamson, 12.1901, *468*; NSW. do., Williamson, 11.1902; BRI. Sorento, A. Morris 1410, 1.10.1925, *469*; NSW. Cape Otway; BRI. DWhy and Tidal Rs., Wilson's Promontory, Lucas 19, 1.1885, *473*; NSW. Deal Is., Bass Straits, Exp. F.N. Club Vict., 1890 (*bis*); MEL.

Tasmania: King Is., "Soil Survey," 1931, *1394*; ADW. King Is. McGowan, *461*; do., Strong, 2.1877, *478*; do., French, 1887, *464*; Flinders Is., Rogers, 9.1907, *476*; Woolnorth, Gunn 466/1827, 25.11.1836, *463*; do., ex herb. Archer 493, 2.1843, *477*; NSW.

South Australia: South Australia, Herb. Schomburgk; AD. Tarcoola (Wilgena), Mellor, 6.1912; Cleve, near Franklin Harbour, 6.1911; JMB. Devil's Gully, 16.9.1882; AD. Morialta Gully, A. B. Black, 4.8.1917; JMB. Mt. Lofty Ra., Addison; Mt. Lofty; BRI. Grasslands, Mt. Lofty Ras., Menzel, 10.1897; AD. Althorpes, Rogers, 9.1907, *475*; NSW. Near Bluff, Victor Harbour, 2.9.1907; Victor Harbour, 10.1911; JMB. Stokes Bay, Kangaroo Island, Rogers, 9.1908, *467*; Kangaroo Island, Staer, 3.1911, *466*; NSW. do., Davies, 6.1937, *3167*; ADW. Cape de Couedic and Rocky R., Kangaroo Is., (Cleland), 16.11.1924; JBC. Ravine de Casoars, K.I., Rogers, 9.1908, *470*; Middle R., K.I., Edwin Ashby 523, 10.190—, *474*; NSW. Waitpinga near Encounter Bay, (Cleland), 2.1921; Encounter Bay, (Cleland), 3.11.1923; JBC. do., (J. M. Black), 1.1924; JMB. Robe-Beachport road, 5.11.1932, *1393*; ADW. Robe and 12 miles N of Millicent, (Cleland), 12.1922; JBC. Mt. Burr near Millicent, Gill, 10.1911, *471*; NSW. Robe, C.W.B., 9.1913; do., (J. M. Black), 10.1910; the Snuggery near Millicent, Cooper, 9.1940; JMB. Hummocks, Rivoli Bay, Mrs. Wehl, 1882; MEL. Beachport, (J. M. Black), 30.11.1917; Glenelg R., "Dry Creek" in S.A., (J. M. Black), 7.1.1908; E of Mt. Gambier, (J. M. Black), 28.11.1917; JMB.

Also, not mapped without locality, Reader 28; MEL. Lake Eyre; AD.

ILLUSTRATION: Maiden, Ill. N.S.W. Pl. **3** t.30, 1911.

22. **S. tephrotricha** F. Muell., Linnaea 25: 392, 1852.

LECTOTYPE: Burra, Nov. Holl. austr. interior (S.A.), Mueller; MEL. (Probable *Haptotype*, not seen, without "Burra"; *K*).

LECTOPARATYPE: Broughton, Hutt and Hill (rivers), S.A., Dr. M(ueller), 10.1851; MEL.

A note by J. M. Black (Trans. and Proc. Roy. Soc. S.Aust. **51**: 381, 1927) states that "the type of this species is in the Kew Herbarium" and that its label is inscribed "*Sw. tephrotricha* F. Muell. Nov. Holl. austr. inter. Dr. F. Mueller. Herbar. W. Sonder". This statement might perhaps be regarded as designation of a Lectotype specimen, but it should be noted that there is no mention on this label of the localities cited by Mueller with his original description. On the other hand, there are in the Melbourne Herbarium two specimens labelled with the data published by Mueller, which are more probably the specimens used by him in compiling his description. In the absence of rules governing the selection of Lectotypes and their publication, it seems desirable that one of these two specimens should be regarded as the Lectotype, because of its location in the author's collection, and because its label is in full agreement with his citation.

EQUIVALENT SYNONYM: *S. lessertiifolia* var. *tephtrotricha* (F.Muell.) Benth., Fl. Aust. **2**: 222, 1864 (partly). *Lectotype,* not seen: "Burra-Burra, F.v.Mueller." This citation by Bentham almost certainly implies the specimen at Kew mentioned above. Although not seen by the writer it was examined some years ago by J. M. Black, whose notes and sketches were kindly made available; it appears to be a Haptotype of *S. tephrotricha* F.Muell. and its designation as Lectotype of Bentham's variety is intended to make the synonymy as absolute as possible.

Rather small ascending or suberect plants with stems 10-30 cm. long, covered with a dense silky-grey pubescence of medifixed hairs, adpressed or with the ends sometimes spreading. *Leaves* 3-10, often about 5, cm. long, with 9-19, usually 13-17, leaflets. *Leaflets* mostly oblanceolate or somewhat narrower, 7-20 mm. x 2-5 mm., often about 10 mm. x 3.5 mm., pubescent on both sides, the apex broadly acute with a small point. *Stipules* narrow-deltoid, 5-8 mm. long. *Raceme* with flowers occupying about half the length, 8 to nearly 30 cm. long with few to 30 flowers, depending on the size of plant. *Flowers* brilliant rose-pink drying purplish, 8-10 mm. long on a pedicel of 1-3 mm. slightly longer or shorter than the subtending bract. *Calyx* 3.5-5 mm. long, the teeth 1-2 mm., covered with dark or mixed dark and light hairs giving a dark-grey, brown or blackish aspect; bracteoles linear 1-1.5 mm. long. *Standard* 9-11 mm. long and broad, the claw rather broad, about 2 mm. long; calli absent. *Wings* 8-9 mm. long, the claw 2-2.5 mm. *Keel* obtuse, 8-9.5 mm. with a claw 3-4 mm. long, and a pair of folds near the auricle. *Ovary* (Fig. 15) adpressed-pubescent with short hairs except for a band along the suture where the hairs are longer and more spreading, 3-4 mm. long at anthesis on a very short gynophore 0.5 mm. long. *Style* (Fig. 15) bearded all along, the tip slightly inflexed with a small, sometimes obscure, tuft of hairs behind the stigma. *Fruit* (*fide* J. M. Black) broadly oblong, pubescent.

DISTRIBUTION: See Map 7, derived from the Types and the following specimens:—

South Australia: Near Mt. Brown, Flinders Ra., Gill 248; MEL. Pekina, Mills, 12.1908; do.(?), Mills, 10.1908; Terowie, E. C. Black, 9.1932 (dup. NSW, *460*); JMB.

THE BEASLEYANA GROUP.

S. elegans and *S. Beasleyana.*

These species form a two-membered *Artenkreis,* with *S. elegans* in the north-west and *S. Beasleyana* in the south-east of their joint range. A small number of specimens combining some characters of both these species have been described as a subspecies of *S. Beasleyana* because the plants are closer to the phenotype of that species than to that of *S. elegans.* The morphology of the three units is suggestive of hybridisation.

There is, however, in the collections already made, no morphological continuity between *S. elegans* and the two subspecies of *S. Beasleyana,* the chief distinctions being shown in Table VI.

23. **S. elegans** sp. nov.

HOLOTYPE: 9 miles E. of Carnarvon, W.A., Meadley, 9.7.1937; PERTH.

PARATYPES: (1) Gascoyne R., between Carnarvon and Timba Timba, W.A., Gardner 6058, 20.9.1941; (2) Cue, W.A., Gardner, 7.1926; PERTH.

Prostrate or ascending herbs, the stems 15 to over 45 cm. long, sparsely clothed with long, loosely spreading, basifixed hairs. *Leaves* 5-9 cm. long with 9-15 leaflets. *Leaflets* lanceolate, acute, 1-2 cm. long, up to 4 mm. wide, equally pubescent on both

TABLE VI.

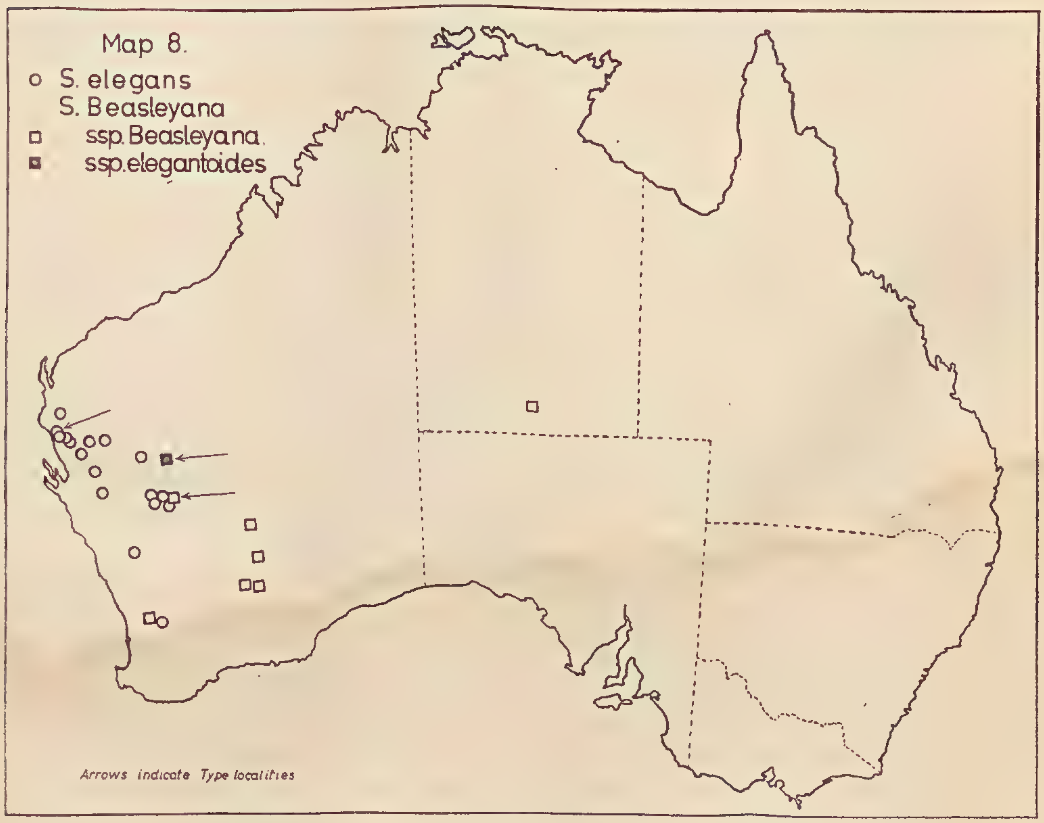
Species.	Keel.	Standard.	Style Tip.	Ovary.
S. elegans...........	About equal to the wings and standard, 10 mm. long (fig. 18b).	With V-shaped thickening (fig. 18a).	Fine, geniculate to reflexed (figs. 18c, d).	Glabrous except for a broad or narrow band of hairs along the suture (figs. 18c, d).
S. Beasleyana ssp. *Beasleyana.*	About equal to the standard, longer than the wings, 14–18 mm. long (fig. 20b).	With two distinct horizontal thickenings (fig. 20a).	Incurved or almost straight (fig. 20c).	Glabrous except for a narrow band of hairs along the suture (fig. 20c).
S. Beasleyana ssp. *elegantoides.*	About equal to the wings, often shorter than standard, 14–16 mm. long (fig. 19b).	With V- or Y-shaped thickening (fig. 19a).	Incurved or almost straight (fig. 19c).	Densely pubescent all over (fig. 19c).

sides or less so above, rather thin, the terminal usually a little longer than the adjacent laterals. *Stipules* large, leafy, the margins laciniate with long and short acute lobes up to 8 mm. long, pubescent like the leaves, more densely on the inner surface. *Racemes* about 15 cm. long, with about 12 flowers in the upper one-third or one-half, the peduncle almost glabrous. *Flowers* violet, 8-12 mm. long, on pedicels of 2-3 mm. exceeding the subtending bract of 1-2 mm.; bracts and pedicels rather sparsely hirsute with short white hairs. *Calyx* 5-7 mm. long, almost glabrous or not densely pubescent outside, the teeth 2.5-3 mm. long, narrow, acute, ciliate, the base often strongly contracted with narrow bracteoles below it. *Standard* (Fig. 18a), 10-12 mm. long and broad, the claw short (1 mm.), without definite calli but with a V-shaped thickening, more or less pronounced, above the claw. *Wings* 9-10 mm. long, the claw 2 mm., obtuse with a broadly rounded apex and frequently shortly ciliate on the auricle. *Keel* (Fig. 18b), 10 mm. long, the claw 4 mm., straight, obtuse, the margin near the claw often with a few hairs. *Ovary* (Fig. 18c, d), 4-6 mm. long on a slender gynophore 0.5-1 mm. at anthesis, glabrous except for a line, narrow in the Types but broader in some other specimens, of straight, white, silky hairs along the suture and continuing up the base of the style. *Style* (Fig. 18c, d) bearded all along, the tip with a fine geniculate segment, often relaxed into a straight or reflexed position. *Fruit* 1.5-2 cm. long, rather thin-walled, cylindrical to ovoid, the row of sutural hairs persisting, the suture deeply intruded.

Herbae prostratae vel ascendentes caulibus ad 45 cm. longis, sparse vestitae pilis longis laxis. Folia 5-9 cm. longa foliolis 9-15, lanceolatis acutis, 1-2 cm. longis ad 4 mm. latis, supra et infra pubescentibus, extremis plerumque lateralia contigua excedentibus. Stipulae foliosae, magnae, margine laciniatae, pubescentes ut foliola. Flores violacei 8-12 mm. longi in pedicillis 2-3 mm. longi, bracteas (1-2 mm.) excedentes. Calyx 5-7 mm. longus, extra subglaber vel non dense pubescens, dentibus acutis 2.5-3 mm. longis. Vexillum 10-12 mm. latitudine et longitudine ecallosum nisi linea V-specie super unguem brevem (1 mm.). Alae 9-10 mm. longae, auricula saepe breviter ciliata, ungue 2 mm. longo. Carina obtusa 10 mm. longa saepe margine sparse ciliato prope unguem 4 mm. longum. Ovarium glabrum praeter lineam secundum suturam pilis rectis albis sericeis. Stylus apice geniculatus saepe extensus vel reflexus. Legumen immaturum cylindricum vel ovoideum, 1.5-2 cm. longum.

Distribution: See map 8, derived from the Types and the following specimens:—

Western Australia: Manilyalya (now Minilya) R., N. of Shark Bay, J. Forrest, 1882 (*bis*); MEL. Gascoyne R., Pollack, 1882; do., Gribble, 1886; do., J. Forrest, 1882; do., Sewell; Wooramel R., Robinson, 1889; Near Mt. Hale, Upper Murchison R., Crossland (2), 1884; Murchison R., Tyson, 1892; MEL. Murchison district, Jones, rec'd. 8.8.1910, *482*; NSW. Cue, 1931, *1391*; ADW. do., ex. herb. W. V. Fitzgerald, 9.1903, *481*; NSW. Near Lake Austin, King, 1886; Interior beyond Arrowsmith's R., Monger; Upper Swan R., Eaton, 1888; MEL.



24. **S. Beasleyana** F. Muell., Chem. Drugg. Aust. 2: 84, 1887.

Lectotype: Near Lake Austin, W.A., King (1), 1886; MEL.

Although Mueller typified this species by the single citation, "In the vicinity of Lake Austin, Henry King and Thomas Beasley", there are, in his Herbarium at Melbourne, two sheets to which this might apply. Both are labelled in Mueller's hand, "S. Beasleyana F.v.M., Near Lake Austin, H. S. King, 1886", without any mention of Beasley's name. There are no specimens of *S. Beasleyana* at Kew (*fide* C. A. Gardner), so apparently these sheets contain the material from which the description was compiled. The contents of these sheets, however, are not conspecific and one has been selected as Lectotype because the description seems to apply more to it than to the other. The second is included in the species described above as *S. elegans*.

Type subspecies: *S. Beasleyana* ssp. *Beasleyana.*

A large, suberect herb with a soft pubescence of rather long, fine, basifixed hairs; leaves with usually 15-19 leaflets about equally pubescent on both sides; stipules broad, toothed; flowers purple, large, the calyx with narrow-acute teeth; standard with horizontal or V-shaped thickenings, keel obtuse, about equal in length to the standard, without pouches or folds; ovary with a band of long, white hairs along the suture in the Type subspecies, densely adpressed-villous all over in the other; style tip incurved or almost straight.

KEY TO THE SUBSPECIES.

Standard with a pair of horizontal calli; keel as long as or longer than the standard; ovary glabrous except for a band of hairs along the suture .... a. ssp. *Beasleyana.*

Standard with a V-shaped thickening; keel sometimes shorter than the standard; ovary densely adpressed-villous all over .... b. ssp. *elegantoides.*

a. ssp. **Beasleyana** (F. Muell. quoad Lectotypum) comb. et. stat. nov.

Lectotype: as for the species.

Absolute Synonym: *S. Beasleyana* F. Muell. quoad Lectotypum.

A rather large, stout-stemmed herb with a pubescence of long, almost woolly, fine basifixed hairs. *Leaves* up to about 12 cm. long with 13-21 (usually 15-19) leaflets. *Leaflets* 7-15 mm. x 3-5 mm., elliptical or obtuse and slightly notched, equally pubescent on both sides. *Stipules* broad-deltoid, laciniate with a few acute teeth, pubescent like the leaflets, 6-10 mm. long. *Racemes* about 20-30 cm. long with 5-10 flowers in the upper one-fourth. *Flowers* probably purple when fresh, 15-16 mm. long on a dark-coloured pedicel of 2-6 mm. subtended by a lanceolate bract of equal length. *Calyx* softly adpressed-pubescent with fine hairs, 8-10 mm. long, the teeth narrow-acute or almost subulate, 3-6 mm. long and equalling or shorter than the tube; bracteoles 1.5-2 mm. long, narrow, attached at the base of the calyx. *Standard* (Fig. 20a) 16-19 mm. long, 11-18 mm. broad with a claw 4 mm. long and two distinct horizontal thickenings above it. *Wings* very obtuse, shorter than the other petals, 10-12.5 mm. long, the claw 4 mm., the auricle sparsely ciliate (as in the Lectotype), or glabrous. *Keel* (Fig. 20b) about equal to or longer than the standard, 14-18 mm. long, the claw 3-4 mm., obtuse, without pouches or folds. *Ovary* (Fig. 20c) glabrous except for a narrow band of long white hairs along the suture, 7-8 mm. long at anthesis, on a slender gynophore 1.5-2 mm. long; ovules more than 30. *Style* (Fig. 20c) bearded all along, the tip incurved or almost straight. *Fruit* cylindrical, 2-4 cm. long, 6 mm. in diameter, glabrous and faintly reticulate, the suture deeply intruded, the walls firm.

Distribution: See Map 5, derived from the Type and the following specimens:—

Northern Territory: Central Australia, J. M. Stuart; MEL.

Western Australia: Malcolm, ? ex herb. W. V. Fitzgerald, 7.1899, *480;* NSW. Between Ularing and Victoria Springs, Young, 1875; MEL. Coolgardie, Webster, 1898, *483*; NSW. 31°7'S. x 121°27'E., A. Forrest; Swan River, Sewell, 1899; MEL.

b. ssp. **elegantoides** ssp. nov.

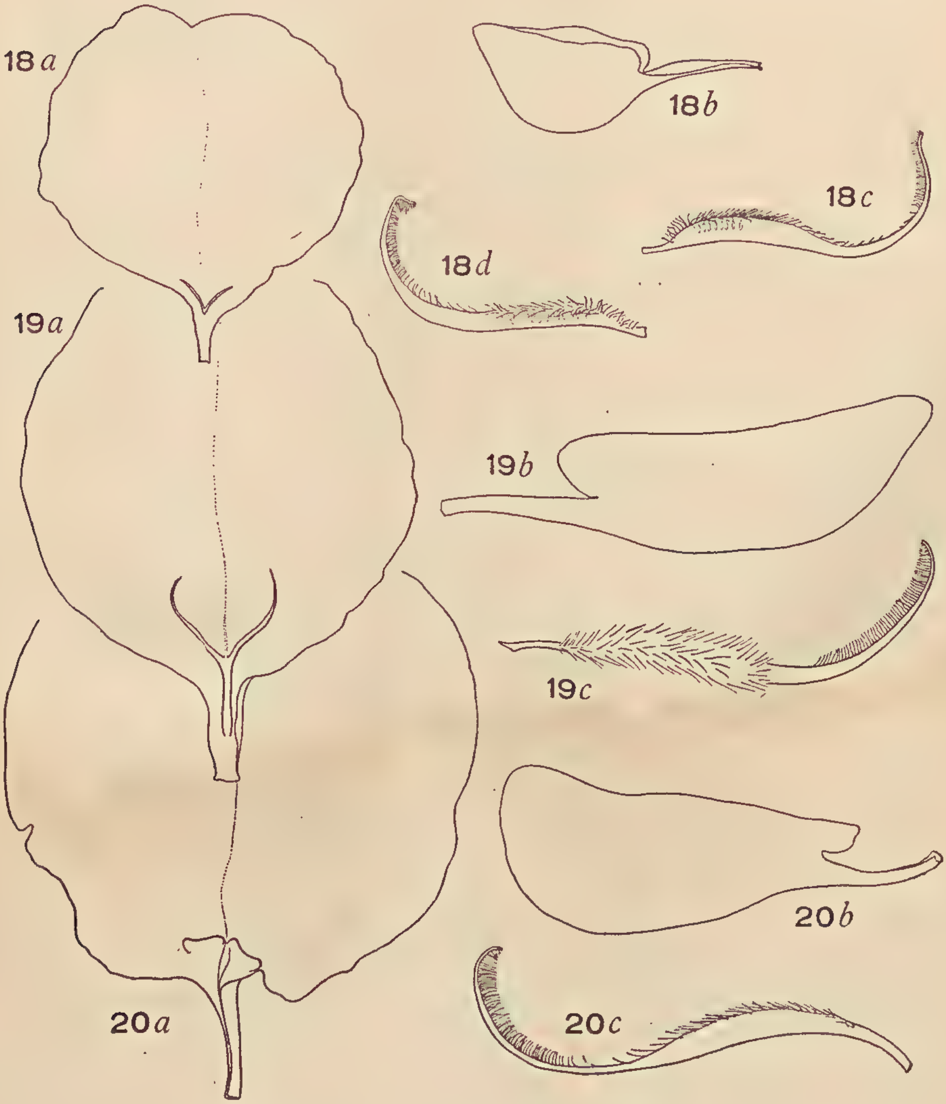
Holotype: Upper Murchison R. near Mt. Hale, W.A., Crossland (1), 1884. MEL.

Stems stout, semierect, up to 40 cm. long, stipules very large, 14-15 mm. long and broad. Differs from ssp. *Beasleyana* in the thickenings on the standard (Fig. 19a) which are linear and V- or Y-shaped, in the often shorter keel, 14-16 mm. long (Fig. 19b), and in the ovary (Fig. 19c) which is densely adpressed-villous all over with long hairs.

Ab ssp. *Beasleyana* in callis V-specie, in carina saepe breviore (14-16 mm. longa) et in ovario ubique dense adpresso-villoso pilis longis differt.

DISTRIBUTION: See Map 8; apart from the Holotype the only other specimen is a cultivated one:

Victoria Park, W.A., Steedman, 1.1919, *479;* NSW.



Figs. 18a-d. *S. elegans* : 18a. standard with V-shaped thickening ; 18b. keel ; 18c., d. pistil showing geniculate and reflexed style tips. Figs. 19a-c. *S. Beasleyana* ssp. *elegantoides* : 19a. standard with Y-shaped thickening ; 19b. keel ; 19c. pistil. Figs. 20a-c. *S. Beasleyana* ssp. *Beasleyana* : 20a. standard with horizontal calli ; 20b. keel ; 20c. pistil. (All x 3.5.)

S. OROBOIDES.

A widely distributed polytypic species in which a number of variants have achieved a considerable degree of discreteness, and which is treated here as a *Rassenkreis* of four subspecies.

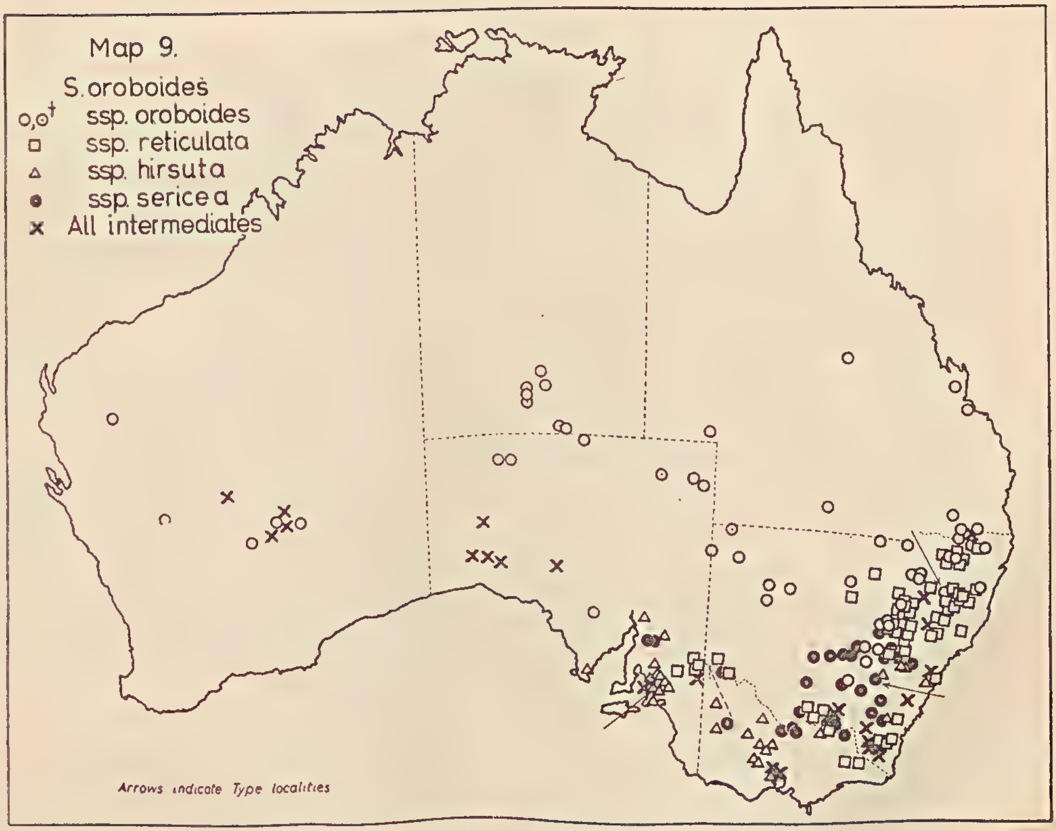
The subspecies *sericea* shows some similarity to *S. phacoides,* and some members of ssp. *reticulata* could be compared with *S. campestris,* though there are marked differences which prevent the assumption of a close relationship in either case.

The absence of close affinities suggests a remote origin for the original form of *S. oroboides,* and this is supported by the degree of differentiation which has occurred in it.

The species comprises a large population extending over the southern half of the continent, and perhaps well into the northern half, if collections from that region were more numerous. The plants comprising it are diverse in several characters and many combinations of these diversities are represented in the collections available. The situation is comparable with that existing in *S. phacoides* except that several of the combinations in *S. oroboides* are more discrete groups, and their recognition as subspecies seems justified and convenient. Three of these groups already bear specific names: *S. tenuis, S. Behriana* and *S. reticulata,* but the intergradation between them belies their specific identity. This intergradation, on the other hand, together with the distribution of the variants, indicates that they are of the nature of geographic races.

The northern part of the specific range (see Map 9) is occupied by the Type subspecies, ssp. *oroboides.* There seems to be very little intergradation towards the eastern part of the range between this population and ssp. *reticulata* which is a well defined form in New England. As ssp. *reticulata* extends south in New South Wales, there are a number of intermediate forms between it and ssp. *hirsuta,* which reaches its most distinctive condition in Victoria and in south-eastern South Australia. The several Syntypes of *S. reticulata* J. M. Black show a trend towards this intermediate condition; they are not typical of the distinctive form taken by the subspecies in New England. In Western Australia the rather meagre collections show a variety of form but do not permit a critical analysis of the variation. The name *S. tenuis* undoubtedly applies to a part of this complex, but it is doubtful whether the part can be considered discrete enough for subspecific rank or whether it is simply a complex from which the subspecies *oroboides* and *reticulata* have differentiated in the north and east of the continent. Distinction between these subspecies rests essentially on their fruits and upon the number and shape of their leaflets. Only one specimen of those from Western Australia bears fruits, and this specimen combines the fruit of ssp. *reticulata* with the leaflets of ssp. *oroboides.* If this combination is in fact constant then it would be justifiable to recognise the population as a distinct subspecies, but in the absence of this evidence, and since there is no other apparent morphological discontinuity between some Central Australian specimens of ssp. *oroboides* and similar plants from Western Australia, a broad concept of ssp. *oroboides* has been adopted to include the Western Australian as well as the Central Australian specimens. This leaves a number of "intermediate" specimens which can be regarded only as the result of combination between ssp. *oroboides* in this broad sense and ssp. *reticulata.*

The subspecies *sericea* is a relatively discrete population occupying the south-western plains and slopes of New South Wales. A few intermediates indicate interchange between this race and ssp. *hirsuta.*



† Pubescence longer or denser and more spreading than in the Type.

25. **S. oroboides** F. Muell. ex Benth., Fl. Aust. 2: 222, 1864.

Type subspecies: *S. oroboides* ssp. *oroboides.*

Lectotype: New England (Clifton), N.S.W., C. Stuart 173; MEL.

Lectoparatypes: (1) Near Warwick, Qd., Beckler; (2) In the Interior (of New South Wales), Moore; (3) Howitt's Expedition (? S.A.) with 2nd label "South of Wills Ck."; MEL.

Of Bentham's five citations, the first three given above are in close agreement, while Howitt's material is similar except in size; the remaining citation "Head of the Gwydir, Leichhardt" (MEL) represents a different group and is included in ssp. *reticulata* below. Since Bentham's order of citation has no significance (being dictated by the State of occurrence), and as flowers, leaves and fruits are all important in distinguishing the variants of this complex species, Stuart's specimen, having all three, is designated Lectotype.

Mostly small, prostrate or ascending plants, pubescent with basifixed hairs or hairs laterally attached at the base in all except the subspecies *sericea* which has asymmetrically medifixed hairs; leaves with few (5) to more numerous (15) leaflets in the various subspecies; leaflets acute, obtuse or retuse, pubescent on the lower or on both sides; stipules narrow, usually small; inflorescence umbellate to rather shortly racemose, flowers bluish, purple or red, the standard ecallose or with two more or less indistinct vertical thickenings, the keel obtuse and with or without a pair of folds; style tip geniculate, the ovary pubescent, the fruit downy, shortly ovoid with the suture a little intruded, or cylindrical with a deeply intruded suture.

KEY TO THE SUBSPECIES.

1. Leaflets 5-7, the terminal leaflet distinctly longer than the laterals, adpressed-pubescent below and glabrous above to more densely spreading-pubescent on both sides with basifixed or subbasifixed hairs, always acute; calyx pubescent with adpressed, short, pale hairs or with more loosely adpressed to spreading, longer, shining or dark-coloured hairs; fruit ovoid, 8-10 mm. long, 5-9 mm. in diameter, the suture intruded about one-fourth of the diameter .... a. ssp. *oroboides.*

1*. Leaflets 5-13 (usually more than 9), the terminal not much longer than the laterals; fruit cylindrical, 10-20 mm. long, 2-5 mm. in diameter, the suture intruded to the base.

  2. Hairs of the pubescence rather long, more or less medifixed; pubescence dense and silvery to very sparse; leaflets usually 9-11, oblanceolate or narrower to narrow-elliptical, the apex acute; inflorescence shortly racemose, the calyx with mixed dark grey and light hairs .... d. ssp. *sericea.*

  2*. Hairs of the pubescence basifixed or laterally attached at the base, the pubescence rather dense to sparse, occasionally silvery.

    3. Leaflets 7-17, usually 9-11, pubescent with loosely adpressed to curved-spreading hairs on both sides, oblanceolate or broader, to narrow-oblong or cultrate; inflorescence shortly racemose, the calyx brown- or white-pubescent or with mixed hairs, the teeth equal to the tube .... b. ssp. *reticulata.*

    3*. Leaflets 7-13, lanceolate or narrower, sparsely hirsute with curved-spreading hairs on both sides, those on the upper surface pointing inwards and towards the apex; inflorescence umbellate, the calyx pubescent with dark brown hairs, the teeth about equal to the tube .... c. ssp. *hirsuta.*

The diagnostic characters of the subspecies are summarised in Table VII.

a. ssp. **oroboides** (F. Muell. ex Benth. quoad Lectotypum) comb. et stat. nov.

TYPE: as for the species.

ABSOLUTE SYNONYM: *S. oroboides* F. Muell. ex Benth. quoad Lectotypum.

EQUIVALENT SYNONYM: *S. tenuis* E. Pritzel, Bot. Jahrb. **35**: 270, 1905, *Holotype*: Murrin Murrin, Austin distr., George, ? 10.1902; presumably destroyed in Berlin Herbarium, 1943. *Tentative Neotype*: East of Laverton, Clarke, Geol. Survey 135, 1916; PERTH.

Mostly small plants with radiating-prostrate, or longer ascending, stems a few to about 30 cm. long, often from a short woody stock. Pubescence in the Lectotype and others rather sparse, of short, very fine, closely adpressed, basifixed hairs, in some central Australian plants denser, the hairs longer, coarser, loosely adpressed to quite stiffly spreading, rather glassy in appearance, and in Western Australia often stiffly spreading. *Leaves* very variable in size, 2-4 cm. long with 5-7 leaflets (Types and others, Fig. 21d), or up to 8 cm. long. *Leaflets* usually quite glabrous above, or in plants with longer pubescence often with some hairs on the upper surface, pubescent below, narrow- or very narrow-elliptical to narrow-lanceolate, or rarely broader, always acute; lateral leaflets 3-30 mm. long (Lectotype 6-10 mm.), the terminal distinctly longer than the adjacent laterals, 9-50 mm. long (Lectotype 11-15 mm.), the ratio between them 1.5:1 to 2:1. *Stipules* narrow-deltoid to acuminate, usually 1-3 mm. long but up to 10 mm. in large-leaved plants. *Inflorescence* up to 15 cm. long, usually 6-9 cm., with 3-5 (rarely up to 10) flowers in a short raceme or an umbel. *Flowers* bluish, purple or red, 7-9 mm. long on a slender pedicel variously clothed with light or darker hairs, usually longer than the subtending bract. *Calyx* (Fig. 21a) similar in pubescence to the leaflets, 4-7 mm. long, the tube 2-3 mm., the teeth 1.5-5 mm. long, usually longer than the tube and finely acuminate; bracteoles minute, linear, often obscure. *Standard* (Fig. 21b) mostly 8-10 mm. long, usually a little longer than broad, the claw short and rather broad, up to 2.5 mm. long, without any calli or with

TABLE VII.

Subspecies.	Pubescence.	Inflorescence.	Calyx.	Leaflets.
oroboides	Sparse, of fine adpressed hairs, or in some C.A. localities coarser or denser, of more or less spreading hairs basifixed or laterally attached at the base.	Umbellate or shortly racemose.	Pubescent like the leaflets, with light hairs, or more densely spreading-pubescent with light or dark hairs; teeth usually finely acuminate, distinctly longer than the tube or at least as long (fig. 21a).	Usually glabrous above but when the pubescence is denser and more spreading, often with some hairs on the upper surface; narrow-lanceolate or -elliptical, always acute, the terminal much exceeding the adjacent laterals; 5–7 per leaf (fig. 21e).
reticulata	Variable in density, the hairs basifixed or laterally attached at the base, curved - spreading or loosely adpressed.	Usually racemose, occasionally subumbellate.	Pubescent with dark, light or mixed hairs, the teeth deltoid, equal to or shorter than the tube.	Usually pubescent on both sides but with fewer hairs above; oblanceolate to narrow-obovate, narrow-oblong or cultrate, usually obtuse or truncate; the terminal a little longer than the adjacent laterals; 7–17 per leaf.
sericea	Dense, silky, to sparse with scattered, finer hairs, more or less asymmetrically medifixed (fig. 24).	Racemose, often about 3 or 5 cm. long, rarely subumbellate.	Pubescent with rather long hairs, nearly always dark and light mixed.	Pubescent on both sides (except in very sparsely pubescent plants where they may be glabrous above), oblanceolate or elliptical or narrower, with an acute apex; the terminal 2–5 mm. longer than the laterals; usually 9–11 per leaf.
hirsuta	Not dense, the hairs somewhat bristly, fine, basifixed, curved-spreading.	Umbellate...........	Pubescent with dark brown to black hairs, the teeth about equal to the tube.	Sparsely hirsute on both sides with the upper surface hairs pointing in and towards the apex, narrow-lanceolate to lanceolate or sometimes obtuse or truncate, the terminal only a little longer than the adjacent laterals; 7–13 per leaf (fig. 22).

two more or less poorly developed, parallel vertical ridges above it. *Wings* usually 6-7 mm. long with a claw 2 mm. long. *Keel* obtuse, 6-7 mm. long, the claw 2-3 mm., a pair of folds present near the auricles or absent. *Ovary* (Fig. 21c) densely adpressed-pubescent, 3-4 mm. long on a gynophore 1 mm. long at anthesis. *Style* rather shortly bearded all along, slightly flattened in the lower half, with a short, geniculate tip (Fig. 21c). *Fruit* (Fig. 21e) downy with spreading hairs, the pericarp thinly coriaceous, inflated, unilocular with the suture intruded for about one-fouth of the diameter, broadly obtuse at both ends, 8-20 mm. long, 5-9 mm. in diameter.

DISTRIBUTION: See Map 9, derived from the Types and representative localities among the following specimens:—

Northern Territory: Alice Springs, (Cleland), 24.8.1936; Burt's Well, (Cleland), 24.8.193?; 8 miles N. of Henbury, (Cleland), 31.5.1935 (dup.*); 15 miles S. of Henbury, (Cleland), 30.5.1935; JBC. Coglin Ck., 15 miles N. of Abminga, Ising, 26.8.1931*; JMB. Charlotte Waters, S.D.E. (A.L.C.), 27.5.1939; AD. do., Byrne, 1887; MEL.

Queensland: Jericho, Upper Barcoo, Walker, 1890; Banks of Fitzroy R., Rosewood, O'Shanesy 1508, 2.1.1876; Port Curtis, Daemel; MEL. Betoota, Blake 12166, 17.7.1936 (dup. NSW *501*); Cunnamulla, do. 11211, 12.4.1936 (dup. NSW *500*); STB. Darling Downs, Lau(terer) 140; MEL. Inglewood, W. of Warwick, Boorman, 9.9.1910, *499*; NSW. Warwick; MEL. Texas, Boorman, 9.1910, *679*; NSW. Also, not mapped: East Australia, Leichhardt (B): Queensland, Bowman, 1871 (dup. NSW *498*); Canal Ck. Q'ld., Hartmann 748, 1882; Dawson Bridge, herb. A. Thozet 959 and 960; Howitt's Exped.; MEL.

New South Wales: Olive Downs, Brough and Beadle, 8.1939*; SYD. Bokhara Ck., Leichhardt; MEL. Mungindi, Cambage 4374, 19.9.1922; SYD. New England (Mangula), C. St(uart); Mangula, *scripsit* Stuart, August; New England; do. C. St(uart); do. (near Tenterfield), Stuart; MEL. Jennings, Maiden and Boorman, 12.1903, *495*; Ashford, Boorman (1), 9.1910, *497*; do., Hayes, 13.4.1908, *496*; NSW. Glen Innes, Porter, 4.1885; Between Darling and Cooper's Ck., Neilson; Cobbam Lake, Bauerlen 250; MEL. Wee Waa, Rupp, 10.1916, *494*; Narrabri, G.V.R.S., 23.9.1936, *493*; do., Betche, 17.10.1886, *492* (?dup. MEL. dated 19.10.1886); Guy Fawkes, Boorman, 4.1914, *491*; NSW. Bogan, McPherson, 1889; Tarella, Bauerlen 23, 8.1887; Darling R., 1886; MEL. Warrumbungle Ras., Forsyth, 10.1901, *490*; NSW. Wilcannia, Darling R., Mrs. Kennedy, 1885; MEL. Minore, Boorman, 2.1899, *489*; Narromine, Maiden, 9.1898, *488*; Dubbo, Boorman, 8.1903, *487*; NSW. Condobolin, Newman, 8.1937; SYD. Forbes, Cashmore, 9.1933, *1396*; ADW. Ardlethan, Cambage 4205, 1.10.1916, *486*; NSW.

South Australia: Abminga Ck., Ising, 22.8.1931; JMB. Camp 4 S.A., Helms, 12.8.1891* (between Officer Ck. and Mt. Goolwa, 12.6.1891 *fide* J. M. Black; dup JMB*); Everard Ras., (Cleland), 29.9.1945*; Seven Mile Ck., S.D.E., 18.7.1939*; AD. Cordillo Downs, 5.1924 (dup. JMB); JBC. Gawler Ras., Sullivan (*bis*); MEL. Also, not mapped: Goyder's Lagoon Bore, 14.8.1934; JBC.

Western Australia: Upper Gascoyne R., Brown, 1890; MEL. Mt. Magnet, W. V. Fitzgerald, 9.1903, *ter 511*; *512*; *515*; NSW. East of Laverton, Clarke, Geol. Survey 135, 1916; Skull Ck., Laverton, Gardner 822, 27.9.1920; between Lenora and Menzies, Blackall, 4125, 9.1939; PERTH.

b. ssp. **reticulata** (J. M. Black), comb. et stat. nov.

LECTOTYPE: Sand, R. Murray, 8.9.1883, Herb. Tate: AD.

LECTOTYPARATYPES: (1) Blanchtown, S.A., 8.1881, Herb. Tate: AD; (2) Lake Victoria, N.S.W., S.A. White, 9.1917; (3) Berri, S.A., (J. M. Black), 2.10.1915; (4) Renmark, S.A., (J. M. Black), 4.10.1915; (5) Lake Barmera, S.A., C. T. White, 9.1922; JMB.

ABSOLUTE SYNONYM: *S. reticulata* J. M. Black, Trans. and Proc. Roy. Soc. S. Aust. **48**: 255, 1924 (Lectotype as above).

EQUIVALENT SYNONYM: *S. oroboides* F. Muell. ex Benth. in part (namely the population agreeing with "Head of the Gwydir, Leichhardt").

Small, suberect, or larger decumbent plants with stems up to about 30 cm. long, clothed with a pubescence very variable in density, the hairs basally attached and rather stiffly curved-spreading, as in the Types, to laterally attached at the base or subbasifixed and loosely adpressed, as in plants from the New England district. *Leaves* commonly 3-5 cm. long with 9-11 leaflets, as in the Types, or less commonly 7-17 leaflets. *Leaflets* usually pubescent on both sides, but with fewer hairs above, oblanceolate to narrow-obovate, narrow-oblong or cultrate, in the Types more or less truncate, usually with a small point; terminal leaflet only slightly exceeding the adjacent laterals or, as in the Lectotype, half as long again as the laterals, often 7-10 and 6-8 mm. long respectively and 1-3 mm. broad (9 mm. and 6 mm. long, 1.25-3 mm. broad in Lectotype). *Stipules* deltoid to acuminate, mostly 3-6 mm. long. *Inflorescence* usually a raceme, or sometimes subumbellate, often 7-10 cm. long with 3-5 flowers (4-7 in Lectotype) occupying about one-fourth of the length. *Flowers* blue to purple, mostly 8-9 mm. long with a calyx commonly 4-5.5 mm. long, the tube 2-3 mm. long the teeth deltoid, brown or white-pubescent or with mixed dark and light hairs, otherwise as in ssp. *oroboides*. *Fruit* (Fig. 23) where present cylindrical with a deeply intruded suture, sometimes curved into a lunate outline, 10-20 mm. long, 2-5 mm. in diameter, rather sparsely downy with short, loosely adpressed hairs, the pericarp firm, thinly coriaceous, smooth or reticulate.

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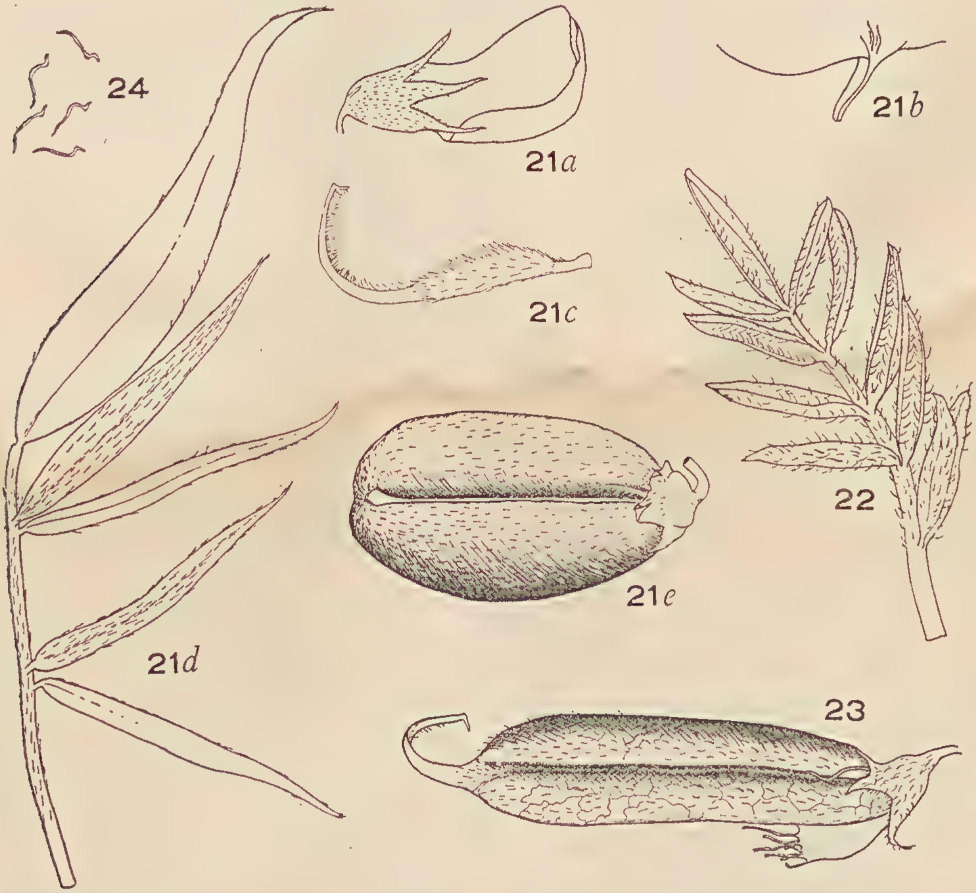
* Pubescence longer or denser and more spreading than in the Type.



Figs. 21-24. S. *oroboides* : Figs. 21a-e. ssp. *oroboides* : 21a. bud with calyx ; 21b. base of standard with longitudinal calli ; 21c. pistil with geniculate style tip ; 21d. leaf ; 21e. pod. Fig. 22. ssp. *hirsuta* : a small leaf. Fig. 23. ssp. *reticulata* : pod. Fig. 24. ssp. *sericea* : hairs of the pubescence. (All × 3.5 except 21d which is a freehand drawing × 1.3.)

Distribution: See Map 9, derived from the Lectoparatypes and representative localities among the following specimens:—

Queensland: East Australia, Leichhardt (A); MEL.

New South Wales: Banks of Mole R., New England district, 108; MEL. Wallangra, via Inverell, Kuhl, 31.7.1909, *549*; Warialda distr., Vickery, 9.1932, *550*; do., Vickery, 26.5.1932; SYD. do., Boorman, 9.1910, *551*; Ashford, Boorman, 9.1910, *582*; Fraser's Ck., Boorman, 9.1910, *581*; Glen Innes, Breakwell, 15.12.1914, *569*; NSW. Castlereagh (?R); Castlereagh River (dup. NSW *559*); MEL. Boggabri, Kenny, 9.1918; BRI. May Vale, Barraba, Cambage 2331, 3.11.1909, *575*; N.E.U.C., Armidale, G. L. Davis, 1.1941, *578*; Arding, near Armidale, H. F. C. Davis, 29.10.1943, *563*; NSW. Armidale, Perrott, 1871 (dup. without date); Head of the Gwydir, Leichhardt (dup. NSW *547*); Mt. Phonolith, head of the Gwydir, Leichhardt 12.4.1843 (with other labels); Uralla, head of Gwydir R., Schofield, 1886; MEL. Uralla, McNutt, 3.1912, *587*; Baradine, Pryor, 21.8.1941, *544*; do., Rupp, 26.10.1932 (dup. SYD.), *545*; NSW. do., Wongan, Cleland, 10.1918; AD. Warrumbungle Ras., Forsyth, 10.1899, *565*; Coonabarabran, Boorman, 9.1916, *586*; do., Boorman, 10.1916, *577*; do., per G.V.R.S., 1929, *592*; Timor Rock, Coonabarabran, Boorman, 9.1908, *572*; Moonbi, Betche, 22.10.1886, *588*; Girilambone, Cadell, 10.1886, *580*; NSW. Kentucky, Fraser and Vickery, 29.12.1934; SYD. New England, C. Stuart (A), with 2nd label Mangula, August; Walcha, New England, Porter 9; MEL. Walcha, Campbell, 10.1899 (*bis*), *579*; *564*; Walcha Road, Boorman, 15.12.1912, *583*; Tamworth, Rupp, 11.1904, *584*; do., Rupp, 9.1904, *591*; Tamworth Common, Dowe, 8.1941, *546*; Gilgandra, Cambage 1122, 10.1904, *567*; Quirindi, Cheel, 1927, *589*; Mendooran, Telfer, 10.1943, *585*; Blandford near Murrurundi, Rupp, 2.10.1944 (*ter*), *571*; *572*; *573*; Murrurundi, Fraser, 10.1897, *576*; Ballimore near Dubbo, Fitzell, 9.1921, *543*; Dubbo, Boorman 104, 8.1903, *556*; P.S. Cobbora, Smith, 17.2.1939, *568*; Barrington R. near Gloucester, Heron, 8.1909, *562*; NSW. Scone, (Cleland), 24.10.1917; AD. Gungal near Merriwa, Boorman, 9.1904, *554*; Cultivated transplant from Belmont, Upper Hunter R., Rupp, 11.9.1940, *590*: NSW. Gulgong, Barnard 119, 1881; MEL. Mudgee, (Cleland), 12.1917; JBC. Dripstone, Althofer, 10.1943, *548*; Bowan Park near Molong. Blakely, 11.1908, *552*; NSW. Orange, (Cleland), 10.1914; AD. Port Jackson (dup. NSW. *558*); MEL. Braidwood distr., Bauerlen 300, 12.1884; MEL. Jerilderie, Dwyer 1187, 10.1920, *557*; Urana distr., Cheel for G.V.R.S., 1909, *566*; Mulwala, Fletcher, 10.1890, *555*; Kybean R., Cambage 2027, 11.1908, *561*; Cooma, Deane, 12.1887, *570*; NSW. Monaro and Genoa distrs., Walter, 12.1869; MEL.

Victoria: Mildura, Wilson, 1889; Murray R. below Albury, C. French Jnr., 10.1884 (4 sheets); Livingstone Ck., (Aust. Alps), no. 203, 1.11.1887; Gippsland, Howitt, 1882; MEL.

c. ssp. **hirsuta** (J. M. Black) stat. nov.

Lectotype: Brighton, S.A., 18.9.1904, J. M. Black.

Lectoparatypes: (1) Burnside, S.A., 2.9.1906, J. M. Black; (2) Railway line, Woodville to Grange, S.A., 9.1906, J. M. Black; (these cited as "Adelaide Plains"); (3) Kerang, Vic., 9.1920, E. Semmens; (4) Wild Flower Show, 22.9.1921; JMB.

Absolute Synonym: *S. oroboides* var. *hirsuta* J. M. Black, Fl. S. Aust.: 320, 1924. Lectotype as for above.

Equivalent Synonym: *S. Behriana* F. Muell. ex J. M. Black, Trans. and Proc. Roy Soc. S. Aust. **51**: 379, 1927. *Holotype* by monotypy, not seen: "In planitie graminosa ad Adelaide. Dr. F. Mueller"; K *fide* J. M. Black, loc. cit. p. 380. (*Haptotype* MEL).

Small decumbent or ascending plants with stems usually under 20 cm. long; pubescence not dense, of somewhat bristly, fine, basifixed, curved-spreading hairs more adpressed on calyx and peduncle. *Leaves* (Fig. 22) with 7-13 leaflets, the terminal only slightly longer than the laterals, narrow-lanceolate to lanceolate, or sometimes obtuse or truncate, concave in dried specimens, 3-25 mm. long, (in the Lectotype and many others 6-8 mm.), 1-2.5 mm. broad, sparsely hirsute on both sides, the hairs characteristically pointing inwards and towards the tip on the less hairy upper surface. *Inflorescence* an umbel of 3 (as in the Lectotype) to about 6 flowers, notable for their dark brown calyces. *Calyx* teeth about equal in length to the tube, rather densely pubescent with dark, loosely adpressed hairs (sometimes white in young state). Other features of the flower as in ssp. *oroboides* except that the thickened ridges of the standard are nearly always absent. *Fruit* where present as in var.

reticulata, though a few immature specimens seem to be more inflated, tending towards the condition in ssp. *oroboides.*

DISTRIBUTION: See Map 9, derived from the Types and representatives from among the following specimens:—

New South Wales: Bathurst, Cleland, 11.9.1913 (dup. NSW *510*); AD. do., Breakwell, 10.1912, *509*; Cowra, Cleland, 10.9.1913, *508*; NSW. Port Jackson, Walter, 10.1898; MEL. Tharwa, Queanbeyan, Cambage 3002, 6.11.1911, *507*; NSW.

Victoria: Australia felix, *506*; NSW. Campaspe, Chamberlin, 11.1875; Lowan, Reader, 12.10.1900; Donald, Williams, 10.1926 (dup. JMB); Craigie, Semmens (dup. JMB); Whipstick Scrub near Bendigo, Audas, 8.1935; Maldon, No. 106, 28.10.1892; Beaufort, Cashmore, 27.9.1932, *1390*; ADW. Skipton, Whan, *503*; NSW. Lara, Gates, 11.1926; MEL. Also, not mapped: Glenelg R. and (2nd label) prope Portum Phillip, Nov. 53; MEL.

South Australia: Nov. Holl. aust., herb. Mueller; "In interioribus N. H. austr. monte M. Remarkable sinus Oct.—"; MEL. W. of Emu Downs, (Cleland), 3.9.1942; Clare, (Cleland), 31.8.1922; JBC. do., E. C. Black, 9.1933; JMB. Holdfast Bay, 1847; MEL. Brighton and Lucindadale; JBC. Munno Para hills, Tate, 18.7.1880; Blumberg, Tate, 26.10.1881; AD. Spalding, J. M. Black, 16.9.1927, *504*; NSW. Mt. Lofty Ra., Bates, 28.9.1925; JMB. Near Mt. Lofty, Tepper 41B, 8 and 9.1881; MEL. Near Lyndoch, (Cleland), 8.10.1927; National Park, (Cleland), 12.10.1941; do., (Cleland), 29.9.1935; Marino, 15.9.1934; JBC. Macclesfield; Macclesfield near Port Adelaide, Blandowsky, sent 1850 (2nd label: Between Port Adelaide and Hahnendorf, Blandowsky, 22.9.1849); Clarendon, Tepper 838, 29.7.1882; do., Tepper, 41A, 10.1881; In planitie graminosa ad Adelaide; MEL. Adelaide Plains, Black, 28.9.1925, *505*; NSW. Blackwood, Menzel, 10.1897; Aldinga, Tate, 1877; AD. Near Aldinga under trees, (Cleland), 14.9.1925; Kuitpo, (Cleland), 11.10.1922; do., (Cleland), 23.9.1928; Encounter Bay, (Cleland), 31.8.1924; do., (Cleland), 29.8.1937; JBC.

ILLUSTRATION: Maiden, Ill. N.S.W. Pl. **3**, t.28 (sub *S. tephrotricha*).

d. ssp. **sericea** ssp. nov.

HOLOTYPE: Cowra, N.S.W., Cleland, 10.9.1913; *527*; NSW. (*Haptotypes*: NSW *542*; AD).

PARATYPES: (1) Wellington district, N.S.W., Althofer, 29.9.1942, *535*; (2) Bathurst, N.S.W., Breakwell (A), 10.1912, *528*; NSW.

Small ascending or decumbent plants with stems usually under 15 cm. long, clothed with a dense grey or silvery pubescence of rather long, adpressed hairs (Fig. 24) distinctly pointed at both ends and attached excentrically. Sometimes the tips of the hairs curl outwards making the pubescence less adpressed; in some plants the hairs are very few and distant so that the silky appearance is lost though the hairs themselves are characteristic in form and attachment. *Leaves* 2-12 cm., often 3-6 cm. long with 5-13, usually 9-11, leaflets as in the Types. *Leaflets* characteristically oblanceolate to narrow-oblanceolate or narrow-elliptical with an acute apex, 4-18 mm. long, commonly 6-12 mm. as in the Types and about 2 mm. wide; terminal leaflets usually longer than the laterals by 2-5 mm.; pubescence about equal on both surfaces except in sparsely hairy plants where the upper side may be almost or quite glabrous. *Stipules* narrow deltoid to acuminate, 4-8 mm. long. *Inflorescence* commonly 8-15 cm. long, with 3-7 flowers occupying up to 3.5 cm. of this length, or less commonly subumbellate. *Flowers* blue to purple, mostly 8-9 mm. long, but with generally larger petals than in ssp. *oroboides,* the standard up to 14mm. broad and 13mm. long with a narrow claw 3mm. long, wings about 9mm. and keel 8 mm. long; standard-calli absent or rarely the thickened ridges of ssp. *oroboides* poorly developed. *Calyx* pubescent with dark hairs, or with dark and light hairs mixed, 3.5-6 mm. long, the teeth about as long as the tube. *Fruit* as in ssp. *reticulata.*

Ab subspecibus omnibus ceteris in pilis centrifixis differt. Plantae sericeo-pubescentes, interdum sparse. Folia saepe 3-6 cm. longa cum 9-11 foliolis. Foliola oblanceolata vel angusto-oblanceolata vel angusto-elliptica apice acuta, saepe 6-12 mm.

longa, 2 mm. lata, circa equaliter utrinque pubescentia. Stipulae 4-8 mm. longae. Flores 3-7 in racemo 8.15 cm. longo, raro subumbellati, plerumque 8-9 mm. longi, petalis paulo majoribus quam in subspecibus ceteris. Vexillum plerumque ecallosum, ad 14 mm. latum, 13 mm. longum, ungue 3 mm. longo. Alae circa 9 mm. longae. Carina 8 mm. longa. Legumen ut in ssp. *reticulata.*

DISTRIBUTION: See Map 9, derived from the Types and representative localities among the following specimens:—

New South Wales: Cudgegong R., Gulgong, Barnard 52; Gulgong, Barnard 207, 1882; Mudgee; Mudgee 19; Castlereagh and Mudgee, Woolls; MEL. Molong, (Cleland), 10.1913 (dup. NSW *520,* coll. Cleland); AD. Bowan Park, Blakely, 11.1908, *536*; Tullibigeal to Tullamore, Cross, 22.9.1938 (*bis*), *533, 534*; Between Rankin Springs and Tullibigeal, Cross 19.9.1938 (*ter*), *537, 538, 539*; Lachlan district, Duff, 1882, *532*; NSW. do., Duff, 94, 1883; MEL. Cargelligo, Boorman, 9.1918, *531*; do., Boorman, 11.1918, *530*; Orange, Cheel, 9.1926, *529*; NSW. Bumberry, (Cleland), 2.10.1916 (dup. NSW *526*); AD. Cowra, Breakwell, 9.1913, *525*; do., Breakwell, 9.1912, *524*; NSW. Ardlethan, Cambage 4222, 1.10.1916, *523*; NSW. do., Cambage 4205, 1.10.1916; Cootamundra, Scammell, 13.9.1927; SYD. Murrumbidgee, L. Calvert (part of) 23; Cavan near Yass, J. S. Calvert (*bis*); MEL. Tumut, Maiden and Boorman, 8.1903, *522*; NSW, Canberra, Williamson 3, 9.1928; JMB. Jerilderie, Dwyer, 10.1920, *516**; Albury, Patterson, 10.1916, *519**; NSW. do., Beattie; MEL.

Victoria: Mildura, Williamson 2, 10.1928; JMB. Upper Murray R., Vic., Quinn 1272, 11.1905, *521*; NSW. Lower Goulburn R., Pye, 1889; Nathalia, Goulburn R., Willis, 20.9.1928; Campaspe, 10.1875 (dup. NSW *517*)*; Wimmera, Dallachy (dup. NSW *518*)*; MEL. Also, not located: Tallandoon, A. Quinn, 1910*; JMB.

South Australia: Gladstone, Francis*; AD. do., 8.10.1908*; JMB. Pine Scrubs, Lower Murray, French, 10.1886*; MEL.

In addition to the specimens of the various subspecies cited above, there are a few which seem to combine the characters of two of these groups in about equal proportions, as detailed below. They are shown on Map 9.

(1) Intermediate between ssp. *hirsuta* and ssp. *sericea.* These plants all have silky pubescence as in ssp. *sericea,* but the hairs are basifixed and often tubercle-based, together with an umbel of flowers with the dark calyx of ssp. *hirsuta.*

New South Wales: Plains near Culcairn, Forsyth, 11.1900, *689*; Albury, Fellowes, 11.1905, *690*; NSW. Near the base of Mt. Kosciusko; MEL.

Victoria: You Yangs, Fullagar; MEL.

(2) Intermediate between ssp. *oroboides* and ssp. *reticulata.* The following have a fine, short, adpressed pubescence as in ssp. *oroboides,* but the leaflets show various features characteristic of ssp. *reticulata,* the calyx teeth are usually shorter and not acuminate, and the fruit in some at least is cylindrical, as in ssp. *reticulata.*

Queensland: Near Maryland, at the border of New South Wales and Queensland, Hickey, 1884 (leaflets obtuse, calyx teeth short, pubescence as in ssp. *oroboides*); MEL.

New South Wales: Moredevil, Co. Pottinger, Burrows, 10.1918, *698* (leaflets as in ssp. *oroboides,* fruits as in ssp. *reticulata*); NSW. Monaro district, Bauerlen 203, 12.1886 (leaflets like those of ssp. *oroboides* in shape but 13 in number); MEL. Jindabyne, Mt. Kosciusko, Maiden and Forsyth, 1.1899, *696* (like the last and the calyx short toothed and sometimes dark haired); Thredbo R., Mt. Kosciusko, Maiden and Forsyth, 1.1899, *697* (like the last); McLachlan R., near Bombala, Maiden, 12.1896, *695* (like the last); NSW.

In South Australia and Western Australia there are a number of specimens in which the spreading pubescence and low number of leaflets correspond to those of ssp. *oroboides* in some of the plants from Central Australia, but the leaflets are obtuse as in ssp. *reticulata* and the inflorescence in some becomes more elongate as in that subspecies; these specimens do not bear fruits.

South Australia: Leisler Hills, Tietkins; Ooldea, Tietkins; MEL. West from Ooldea, Tietkins, 9.1879; Pidinga, Tietkins, 9.1879; AD. Between Youldeh (now Ooldea) and the Elizabeth, Young (1), 1875; MEL.

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*Pubescence sparser, hairs very asymmetrically medifixed, sometimes nearly basifixed.

Western Australia: Mt. Sir Samuel, Gardner 2419, 26.7.1931; Skull Ck., Laverton, Gardner 2457, 10.8.1937; PERTH. Laverton, Maiden (2), 9.1909, *513*; NSW.

One other specimen combines leaflet and pubescence characters of ssp. *oroboides* with the narrow-cylindrical fruit of ssp. *reticulata*.

Western Australia: Laverton, Maiden (1), 9.1909, *514*; NSW.

(3) Intermediate between ssp. *hirsuta* and ssp. *reticulata*. The characters which show different combinations here are chiefly those of the inflorescence and the pubescence (rather sparse and stiffly spreading on acute leaflets as in ssp. *hirsuta*, or often moderately dense and loosely adpressed on obtuse leaflets as in ssp. *reticulata*).

New South Wales: Scone, Cambage 1662, 31.8.1907, *694* (pubescence and leaflets of ssp. *hirsuta*, inflorescence racemose, the calyx not very dark); NSW. Gulgong, Barnard 91 (pubescence nearer that of ssp. *reticulata*, inflorescence umbellate, the calyx dark); MEL. Sydney, Haswell (pubescence of ssp. *reticulata*, the leaflets very obtuse, inflorescence umbellate, the calyx dark); BRI. Wingello, Boorman, 29.12.1913, *692* (pubescence of ssp. *reticulata* and the leaflets rounded-obtuse, inflorescence and calyx of ssp. *hirsuta*); Cooma, Betche 12.1890, *691* (pubescence and leaflets like the last, inflorescence almost umbellate, the calyx dark); NSW.

Victoria: Little R., near Geelong, No. 6 (hairs of pubescence long as in some ssp. *reticulata*, inflorescence umbellate, calyx dark); MEL.

South Australia: Loxton, (Cleland), 28.1.1924 (pubescence dense, curved-spreading, inflorescence racemose); JBC. Clarendon, Tepper 41c, 1881 (pubescence of ssp. *reticulata*, inflorescence umbellate, the calyx dark); MEL.

Location not known: Birksgate, Koch 904, 9.1902, *693* (pubescence of ssp. *reticulata*, inflorescence umbellate, the calyx dark); NSW.

S. CAMPESTRIS.

Although there is considerable similarity in this species to some members of *S. oroboides* ssp. *reticulata*, it also seems to have affinities with *S. microcalyx* in the STIPULARIS group. From *S. oroboides* it is distinguished by its inflexed, not geniculate, style tip, while from the STIPULARIS group its basitrichous pubescence is a clear distinction. The pubescence commonly present on the back of the standard is peculiar in the genus, though it is common in several other genera of Leguminosae.

26. **S. campestris** J. M. Black, Proc. Roy. Soc. S. Aust. 48: 255, 1924.

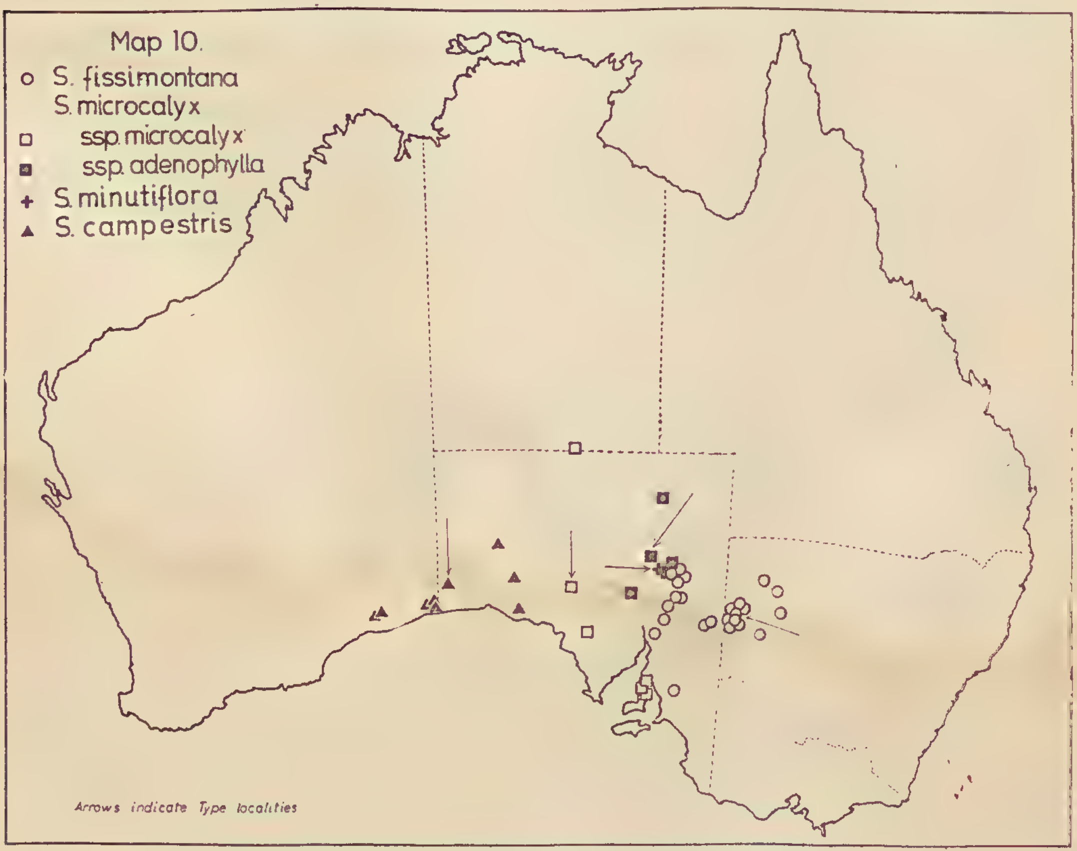
HOLOTYPE, by monotypy: Hughes Railway Station, Nullarbor Plain, S.A., Ising, 6.9.1920; JMB (*Haptotype*, possible *Isotype*, NSW *596*).

Small ascending plants, the stems often rather rigid, with a somewhat sparse pubescence of short, white, adpressed hairs laterally attached at the base. *Leaves* 3-10 cm. long with usually 7-9 leaflets. *Leaflets* 8-20 mm. usually 10-15 mm. long, 1-2 mm. broad, linear to narrow lanceolate, acute, sparsely pubescent below, almost or quite glabrous above. *Stipules* narrow, acute to subulate, 2-6 mm. long. *Racemes* with rigid peduncles, the whole up to 18 cm. long, with 3-9 flowers in the upper one-third or less. Flowers purple, 8-9 mm. long, on a pedicel of about 2 mm. in the axil of a short deltoid bract about 1.5 mm. long. *Calyx* rather densely pubescent with loosely adpressed, dark brown hairs, or less commonly with mixed dark and light hairs, 4-5 mm. long, the teeth 1.5-2 mm., shorter than or equalling the tube, with a pair of bracteoles less than 1 mm. long attached at the base. *Standard* about 9 mm. long and broad, the rather narrow claw 3-5 mm., ecallose or with 2 oblique, convergent thickened lines or ridges above the claw and often with a few hairs on the back. *Wings* 7.5-8.5 mm. long, the claw 3.5 mm., rounded-truncate at the apex, the auricles usually ciliate with yellowish hairs (in dried specimens). *Keel* obtuse, 7-9 mm. long, the claw 3-4 mm. with 2 small but distinct folds above it; in some flowers, including those of the Holotype, the keel apex has a slight but definite sideways twist. *Ovary* densely white-pubescent with adpressed hairs, 3-4 mm. long at anthesis, subsessile on a gynophore less than 1 mm. long. *Style* bearded all along, slightly flattened towards the base, the tip inflexed or straightening out from that condition. *Fruit* narrow-cylindrical, often upturned distally, the suture deeply intruded forming two loculi, each with about 10 seeds; pericarp short-villous with white hairs, spreading and often minutely bulbous-based in older fruits, 15-17 mm. long, 4 mm. in diameter.

DISTRIBUTION: See Map 10, derived from the Types and the following specimens:—

South Australia: Interior of S.A., Jones, 1889; North East Nullarbor Plain, St. Carey, 1877; MEL. Nullarbor Stn., Fowler's Bay, Brown, 8.1907, *597*; NSW.

Western Australia: Eucla, St. Carey, 1877; do., Oliver, 1881; do., Turner, 1885 (*bis*); MEL. N. of Eyre's Sandpatch, Tomson, 1882; do., Thompson and Herbert; AD.



THE STIPULARIS GROUP.

S. microcalyx, *S. minutiflora*, *S. fissimontana* and *S. stipularis*.

There is a curious interrelationship between the members of this group which is somewhat obscured by apparent dissimilarity. *S. minutiflora* and *S. microcalyx* are very similar, the distinctly smaller flowers and denser pubescence of the former being their chief differences; the single specimen from which *S. minutiflora* is known precludes further consideration of its position in the group. *S. fissimontana* is, as a rule, clearly distinguished by the definite turn of the keel-apex, but in some of the inland South Australian localities this turn is much reduced and the flower becomes quite similar to that of *S. microcalyx*, because of this change and by decrease in the thickenings of the standard. On the other hand, the stronger standard thickenings of the Type form of *S. fissimontana* are comparable with the condition seen in two of the varieties of *S. stipularis*.

Among the varieties of *S. stipularis* there are grounds for comparison also with another meditrichous species, *S. Murrayana* (see below), which may also have affinities with this group, particularly with S. *stipularis*. Features common to both *S. Murrayana* and *S. stipularis* are the strongly flattened style base, the hooked style tip and the longitudinal thickenings or folds on the standard.

A feature common to all members of the STIPULARIS group, but not seen in *S. Murrayana*, is the pair of distinct, deep folds or pouches in the keel. The distinguishing characters of species of the group are summarised in Table VIII.

TABLE VIII.

Species.	Keel.	Standard.	Style Tip.	Wings.	Flower.	Peduncle.
S. microcalyx ...	Straight or almost so (fig. 26c).	With two faint to distinct thickened vertical lines near the claw (fig. 26a).	Minutely inflexed (fig. 26b).	6–7·5 mm. long.	Purple ...	Pubescent.
S. minutiflora ...	do ...	do ...	do ...	4·5 mm. long	Pink	do
S. stipularis var. *stipularis.*	Twisted sideways (fig. 28c).	Ecallose or with punctate calli (fig. 28a).	Hooked, incurved or geniculate to recurved (fig. ved (fig. 28d, e).	Usually 10–12 mm. long, the apex ± orbicular (fig. 28b). ...	Brownish to red.	do
S. stipularis var. *purpurea.*	Indistinctly twisted or almost straight.	With two longitudinal folds or ridges.	Incurved to recurved.	Usually 10–12 mm. long, oblong or like the last in shape.	Purple ...	do
S. stipularis var. *longialata.*	Almost straight (fig. 29c, d).	With two longitudinal folds or ridges (fig. 29a).	Incurved to recurved (fig. 29e).	12 mm. long oblong (fig. 29b).	do ...	do
S. fissimontana	Distinctly twisted sideways or in some inland localities, nearly straight (fig. 27b).	With two thickened vertical lines in and above the claw (fig. 27a).	Minutely inflexed (fig. 27a).	9–12 mm. long.	Pink	Glabrous.

27. **S. microcalyx** J. M. Black, Trans. and Proc. Roy. Soc. S. Aust. 48: 255, 1924.

HOLOTYPE, by monotypy: Tarcoola, S.A., Ising, 21.9.1920; JMB (*Haptotypes*: three JMB; one NSW *594*; one MEL.).

TYPE SUBSPECIES: *S. microcalyx* ssp. *microcalyx*.

Rather small plants with a pubescence of short, medifixed hairs, the leaves with 7-9 leaflets, oblanceolate to linear, the apex retuse, with or without a yellow gland between the lobes; peduncle of the raceme with a few hairs: flowers purple, the calyx small (3-5 mm. long) with short teeth, the standard without distinct calli, the keel straight or with a very slight sideways twist, with a pair of pouches near the claw; style tip minutely inflexed; fruit cylindrical, hoary, reticulate, the suture intruded to the base.

KEY TO THE SUBSPECIES.

Leaflets 10-15 mm. long, with a small yellow area resembling a gland, or eglandulose, oblanceolate to narrow-oblong, retuse. .... a. ssp. *microcalyx*.

Leaflets with a well developed yellow gland between the thick, rounded lobes, often linear and longer than in the former subspecies. .... b. ssp. *adenophylla*.

a. ssp. **microcalyx** ssp. nov.

TYPE as for the species.

ABSOLUTE SYNONYM: *S. microcalyx* (J. M. Black sensu orig.) comb. et stat. nov.

Slender plants with stems often 15-30 cm. long, more or less ascending, with a rather sparse pubescence of short, flattened, adpressed, medifixed greyish or white hairs. *Leaves* 3.5-9 (mostly 4-5) cm. long with 7-9 leaflets. *Leaflets* (Figs. 25a, b) oblanceolate to narrow oblong with a retuse apex, usually flat in herbarium specimens, about 10-15 mm. x 2-3 mm., less pubescent above than below or more commonly glabrous above except on the margin and pubescent underneath, in some specimens (including the Holotype) with a small yellowish area in the notch resembling an incipient gland like that seen in ssp. *adenophylla*. *Stipules* linear-acute to deltoid, 2-5 mm. long. *Racemes* usually 12-15 cm. long with 6-15 flowers in one-third or less of the length, the slender peduncle sprinkled with a few hairs. *Flower* purple or pink, 6-7 mm. long on a slender pedicel of 1-2 mm., as long as or longer than the narrow, sheathing bract. *Calyx* 3 mm. as in the Holotype to 5 mm. long, sparsely pubescent, the teeth narrow, shorter than the tube, 1-2 mm., the bracteoles narrow, to 1.5 mm., attached on the pedicel or calyx-base. *Standard* 6-8 mm. long and broad, gradually tapered into the broad claw only 2 mm. long, without distinct calli but sometimes with 2 more or less distinct, thickened lines (very faint in the Holotype) in the claw and diverging shortly above it. *Wings* 6-7.5 mm. long, the claw 2-2.5 mm. *Keel* apparently straight, though in old flowers with a tendency to twist sideways, 6-8 mm. long, the claw 2.5 mm. with 2 pouch-like folds above it. *Ovary* with the sides hoary or densely adpressed-pubescent with short hairs, the suture marked by a band of longer hairs, 2-3.5 mm. long at anthesis on a gynophore of 1 mm. *Style* usually recurved rather sharply over the ovary with the beard all along the recurved part, the apex minutely inflexed. *Fruit*, in the only mature specimen, cylindrical-oblong, reticulate, hoary with scattered adpressed hairs, 9 mm. x 3.5 mm., but from immature specimens probably becoming longer than this, the suture intruded to the base.

DISTRIBUTION: See Map 10, derived from the Type and the following specimens:

Northern Territory: Charlotte's Waters, H. Kempe, 1885; MEL.

South Australia: Plain 40 miles E. of Wirrulla, 8.1928 (dup. JMB); JBC. Paskeville, Yorke's Peninsula, Beythien 163, 1888; Yorke Penins., Tepper 148, 1879; MEL. Ardrossan, Tepper, 11.1879 (dup. JMB); AD.

b. ssp. **adenophylla** (J. M. Black) comb. et stat. nov.

HOLOTYPE, by monotypy: Finniss Springs, S.A., Warren, 5.9.1926. JMB (*Haptotype* MEL).

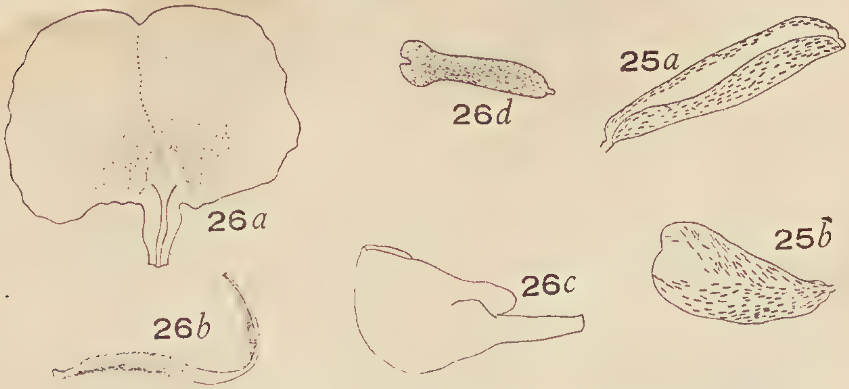
ABSOLUTE SYNONYM: *S. adenophylla* J. M. Black, Trans. and Proc. Roy. Soc. S. Aust. **50**: 284, 1926.

Differs from ssp. *microcalyx* chiefly in the longer, linear leaflets (Fig. 26d) with well developed glands at the apex of some of the leaflets at least, and perhaps in the more abrupt narrowing of the standard (Fig. 26a) into its claw. The leaflets are usually strongly incurved or folded in dried specimens and, when flattened, the lobes at the apex are thick and orbicular with the yellowish gland between them and the hairs following the leaf-outline around it. Other distinctions between these groups enumerated by Black from limited material, do not seem to be constant: plant size seems to be similar though some specimens of ssp. *adenophylla* are many-stemmed and more compact than those of ssp. *microcalyx;* the "confluent calli" on the standard are found developed to a similar degree in both groups as are the pouch-like folds on the keel. See Figs. 26b (pistil), and 26c (keel).

See also *S. fissimontana,* some forms of which are closely related to *S. microcalyx* and to *S. stipularis* var *longialata.*

DISTRIBUTION: See Map 10, derived from the Type and the following specimens:

South Australia: Warburton R., E.G.M. (Herb. Tate); AD. 6 miles NE of Farina, S.A.White, 11.9.1916; JMB. Lake Weatherstone, 1.9.1883; Arcoona, Murray 117, 9.9.1927 (dup. NSW *595*; JMB); AD.



Figs. 25-26. *S. microcalyx* : Figs. 25a, b. ssp. *microcalyx* : leaflets. Figs. 26a-d. ssp. *adenophylla* : 26a. standard with thickened lines in the claw ; 26b. pistil ; 26c. keel ; 26d. leaflet. (25a, b. × 2 ; 26a-c. × 3.5 ; 26d. × 1.3, freehand.)

28. **S. minutiflora** sp. nov.

Holotype: Mt. Lyndhurst, S.A., Koch 484, 8.1899, *593*; NSW.

Prostrate, herbaceous plants with several stems about 20 cm. long radiating from a central tap root, densely pubescent with medifixed, adpressed, flattened white hairs. *Leaves* 2.5-5.5 cm. long with 5-9 leaflets. *Leaflets* oblong to narrow-oblong with an obtuse or retuse apex, 7-12 mm. long, 2.5 mm. wide, glabrous above, densely adpressed-pubescent below, the hairs becoming scanty with age. *Stipules* linear-subulate to narrow-deltoid, entire, 3-4 mm. long. *Racemes* 4-10 cm. long with about 3-7 small flowers in the upper one-third. *Flowers* very small, pinkish, 4-5 mm. long on a pedicel 1.5-2 mm. long slightly exceeding the bract. *Calyx* about 2 mm. long, the tube and teeth about equal in length, the bracteoles minute, obscure in the pubescence. *Standard* 4 mm. long and broad, the claw 1 mm., without callosities except for two obscure, fine, raised lines. *Wings* 4-5 mm. long, the claw and lamina equal in length. *Keel* narrow-obtuse, 3-4 mm. long, the claw nearly 2 mm., with a pair of minute folds near the auricle. *Ovary* sessile, hoary with very closely adpressed hairs or almost glabrous except for a rather thick band of dense, creamy or tawny hairs along the suture, 2mm. long at anthesis. *Style* bearded all along with short hairs, flattened, the tip minutely hooked or inflexed. *Fruit* 2-2.3 cm. long, almost 2 mm. in diameter, shortly tapered at both ends, adpressed-hoary with asymmetrically medifixed hairs, the suture deeply intruded.

Herba procumbens ad *S. microcalyx* persimilis sed pilis longioribus densiuscule pubescens et in floris partibus omnino minor. *Flores* minimi, punicei, 4-5 mm. longi in pedicello 1.5-2 mm. longo bracteam paulo excedente. *Calyx* circa 2 mm. longus tubo et dentibus subaequilongis et bracteolis minutis in pubescentia obscuribus. *Vexillum* 4 mm. longum et latum, ungue 1 mm. longo, ecallosum nisi lineis tenuibus duabus. *Alae* 4-5 mm. longae, laminam ungue aequante. *Carina* anguste-obtusa, 3-4 mm. longa, ungue fere 2 mm. longo sinibus duobus minutis prope auriculam. *Ovarium* adpresso-canum, vel fere glabrum sed in sutura pubescens, anthese 2 mm. longum, stylo basi compresso apice inflexo vel adunco. *Legumen* 2-2.3 cm. longum, circa 2 mm. diametro, secundum suturam alte intrusa.

This species is very similar to *S. microcalyx* ssp. *microcalyx*, but distinctly smaller in all its floral parts and with a denser pubescence of longer hairs.

Distribution: See Map 10; known only from the Type specimen.

29. **S. fissimontana** J. M. Black, Trans. and Proc. Roy. Soc. S. Aust. 51: 381, 1927.

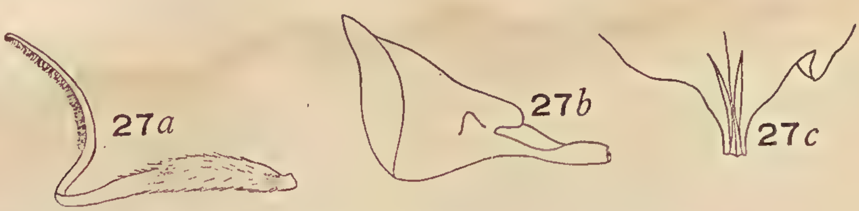
Lectotype: Near Broken Hill, N.S.W., A. Morris 1346, 5.9.1925; JMB (*Haptotype* NSW *601*).

Lectoparatypes: (1) Broken Hill, N.S.W., A. Morris 26, 8.1919, *602*; NSW (this specimen is not extant in JMB, nor in AD from which J. M. Black derived some of his Type citations; it is not known whether the specimen at NSW is actually the one examined by Black or whether it is in reality a Haptotype). (2) Thompson's Siding, N.S.W., A. Morris 1450, 12.9.1926; JMB (*Haptotype* NSW *603*); (3) Boolcoomatta Stn., S.A., A. Morris 1449, 22.8.1926; JMB.

Equivalent Synonym: *S. fissimontana* var. *coarctata* J. M. Black, Trans. and Proc. Roy. Soc. S. Aust. **52**: 225, 1928. *Lectotype*: Hawker, Flinders Ra., Black, 18.10.1917; JMB. (Two specimens with the same label but marked 'A' and 'Same as A' are too imperfect to determine accurately, but do not seem to be part of the Lectotype plant).

Rather small ascending herbs, the stems 10 to more than 40 cm. long with a moderately dense pubescence of adpressed, white, medifixed hairs. *Leaves* 2.5-8, commonly 3-6, cm. long with 7-13, commonly 9-11, leaflets. *Leaflets* very narrow-elliptical, or more oblong and broader in the lower leaves, commonly 10-15 mm. long (5-20 mm.) and 1.5 mm. broad (1-3.5 mm.), equally pubescent on both sides, the terminal only slightly longer than the laterals. *Stipules* narrow, acuminate about 5-8 mm. long. *Raceme* 8-30 cm. long with few flowers (3-6) in the shorter inflorescences to about 10 in longer ones, occupying about 1/4 or 1/3 of the length. *Flower* magenta (*fide* A. Morris), 8-10 mm. long on a slender, usually dark-pubescent pedicel of 3-7 mm., the subtending bract 1-2 mm. long with a few dark hairs. *Calyx* 5-6.5 mm. long with a moderately dense pubescence of dark brown or black hairs, the narrow teeth 2-3 mm., the bracteoles up to 1 mm. long. *Standard* (Fig. 27a) 9-13 mm. long and about as broad, the claw 2-2.5 mm. with a pair of parallel thickened lines or folds in it diverging shortly in the lamina. *Wings* 9-12 mm. long, the claw 3-3.5 mm. *Keel* (Fig. 27b) twisted sideways, in many pressed specimens with the tip characteristically folded back, 8-10.5 mm. long, the claw 3-4 mm., with a pair of deep pouches near the auricle. *Ovary* (Fig. 27a) adpressed-pubescent, 3-4 mm. long at anthesis on a very short gynophore. *Style* (Fig. 27c) bearded evenly for most of its length, flattened towards the base, the tip minutely inflexed. *Fruit* pubescent with adpressed or softly spreading hairs, 15-30 mm. long, 4-5 mm. in diameter the suture deeply intruded, the stipes slightly elongated to equal the calyx tube.

In the type locality this species assumes a rather open habit, the stems often few, and the leaflets rather widely spaced. In South Australia, especially in some (but not all) of the inland localities, there is a tendency to form a more compact plant with short nodes and leaflets rather close together. There is a tendency in some of these plants for the strong sideways turn of the keel apex to be reduced to a slight twist, not very distinct, and sometimes the thickened lines on the standard are also reduced to extinction. These distinctions from the type are, however, not well correlated, and as the seasonal environment may well influence the habit, and as the keel twist seems to vary with age in some plants, they are not considered sufficient to justify separation.



Figs. 27a-c. *S. fissimontana*: 27a. pistil; 27b. keel with deep pouches; 27c. baseof standard with thickened lines. (All × 3.5.)

Distribution: See Map 10, derived from the Types and representative localities among the following specimens:—

New South Wales: Mt. Goningberri (now Koonenberry), V.E.E. 31.12.1860; Tarella Bauerlen 112, 8.1887; Barrier Ra., Irvine, 1889 (*bis*); do., Irvine, 6.1889; do. Beckler; do., Wehl, 1889; Wilcannia, Kennedy, 1885; Yandarlo via Wilcannia, Kennedy, 1886; near Silverton, Charsley, 1886; do., Irvine, 8.1889; MEL. Silverton, Pidgeon and Vickery, 24.8.1939, *605*; Broken Hill, Andrews, 12.1917, *607*; do., Pidgeon and Vickery, 22.8.1939, (dup. SYD), *606*; do., Cheel, 8.1926, *607*; NSW. Broken Hill, A. B. Black, 9-10.1917; JMB. Menindie, P.E.W. per Deane, *612*; NSW.

South Australia: Mt. Lyndhurst, Koch, 9.1898 (dup. JMB); do., Koch 312, 9.1898 and on same sheet, 228, 8.1899 (dup. NSW *600*); do., Koch 228, 8.1898; do., Koch 228, 10.1898; (dup. MEL; NSW *599*); AD. do., Koch 228, 8.1897, *604*; NSW. do., Koch without number, 1896; JMB. Mt. Searl, Warburton; MEL. Nepabunna, (Cleland), 5.9.1941 (*bis*); Beltana, (Cleland), 17.8.1921; do., (Cleland), 3.9.1941; JBC. Flinders Ra. (J. M. Black), 1908; Hawker (J. M. Black), Flinders Ra., 18.10.1917; Koonamore Stn., Osborn, 28.8.1923; JMB. ?Quorn, 2.9.1941; JBC. Roseworthy, T.G.B.O., 8.1915; JMB.

30. **S. stipularis** F. Muell. Linnaea 25: 393, 1852.

HOLOTYPE, by monotypy: Akaba (*recte* Arkaba, *fide* J. M. Black), N. Holl. Austr. interior (S.A.), Mueller, 10.1851; MEL.

This specimen is pubescent with definitely medifixed hairs, as was noted by Black in sketches on his herbarium sheet but erroneously said to be basifixed in his published note on the subject (Trans. and Proc. Roy. Soc. S. Aust. **51**: 382, 1927).

TYPE VARIETY: *S. stipularis* var. *stipularis.*

Ascending herbs of moderate size with a dense adpressed pubescence of medifixed hairs, the leaves with 7-13 leaflets, the laterals usually retuse, the apical lanceolate to oblong, scarcely retuse, pubescent on both sides; stipules narrow-deltoid and entire, or larger and irregularly toothed; flowers reddish-brown or brown in the Type variety, purple in the others, the standard ecallose or with punctate calli, or with a pair of vertical folds near the claw, the wings orbicular distally, or more or less oblong, the keel twisted sideways to straight; ovary closely adpressed-pubescent or rarely glabrous, the style with a sickle-like curve, flattened towards the base, the tip incurved, broadly hooked, geniculate or slightly recurved; fruit cylindrical with a deeply intruded suture.

KEY TO THE VARIETIES.

1. Keel distinctly twisted sideways; standard ecallose or with small punctate calli; flowers reddish or brown; wings almost orbicular in the upper half .... α. var. *stipularis*

1.* Keel scarcely twisted, or straight; standard with longitudinal folds; flowers purple; wings as in var. *stipularis* or oblong.

2. Wings almost orbicular in the upper half, or if oblong, usually smaller than in var. *longialata;* keel with a slight twist sideways .... β. var. *purpurea*

2.* Wings long and broad, 12 mm. x 3 mm.; keel narrowly obtuse, not twisted .... γ. var. *longialata*

α. var. **stipularis** (F. Muell. sensu orig.) comb. et stat. nov.

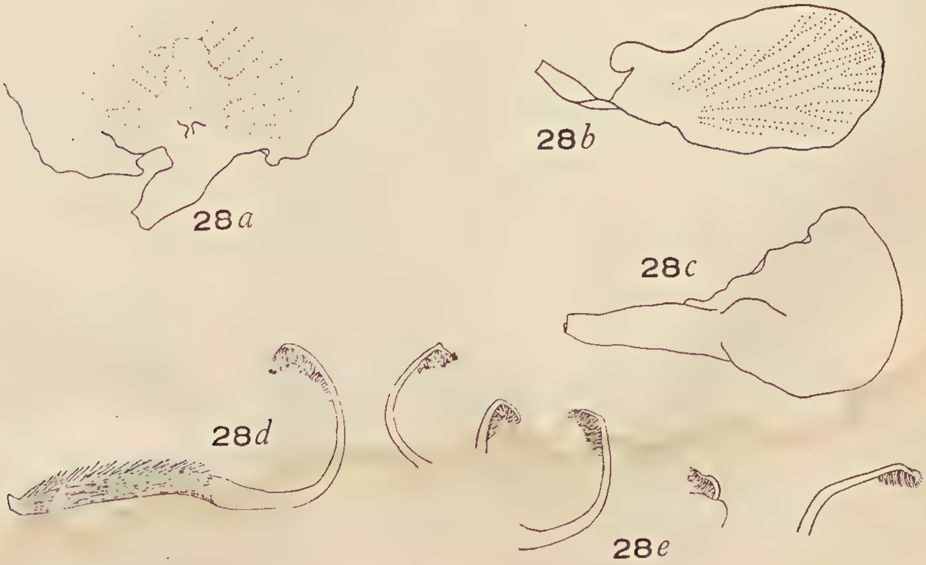
HOLOTYPE: as for the species.

ABSOLUTE SYNONYM: *S. stipularis* F. Muell. sensu orig.

EQUIVALENT SYNONYM: *S. phacifolia* F. Muell. *nomen nudum,* S. Aust. Regist. 19.2.1850.

Rather large spreading herbs, the stems in well grown plants often stout and over 70 cm. long, or only 5 or 6 cm. high in small, more compact plants, with a more or less dense, grey, silky pubescence of closely adpressed, medifixed, usually colourless hairs. *Leaves* commonly about 6-8 (Type 8) cm. long with 7-13 (Type 11-13) leaflets. *Leaflets* pubescent on both sides though usually less densely, or rarely glabrous, above, the hairs usually following the outline in a definite pattern, especially near the apex; usual length 9-12 mm. and width 2-4 mm. but dimensions very variable; lateral leaflets narrow-oblanceolate to obovate or cuneate, the apex retuse with a point in the notch, the lobes often similar to the central point, giving the leaflet a three-toothed, truncate appearance; terminal leaflets usually distinctly longer than the adjacent laterals and often different in shape, being lanceolate, oblong or scarcely retuse, up to 25 mm. long. *Stipules* characteristically large, pubescent like the leaves and irregularly toothed, as in the Type, but sometimes smaller, narrow-deltoid, and entire or almost so. *Raceme*

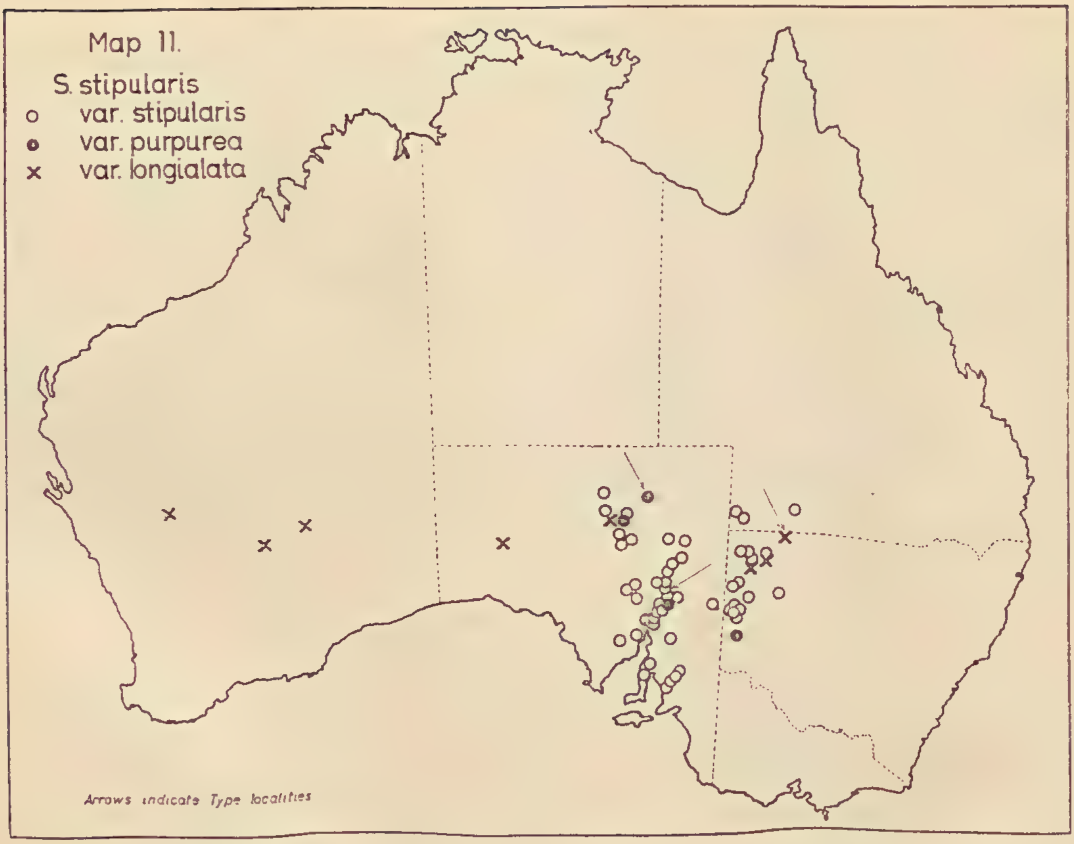
10-30 cm. long, often 15-20 (Type 17) cm., with about 5-10 (Type 8) flowers, or less commonly up to 20 flowers, in the upper one-third. *Flowers,* as far as shown by collectors' notes, always copper-brown, reddish, yellowish or brownish, though some have a purplish tint on drying, variable in size, in the Type and many others 10-11 mm. long, on a pedicel 2 or 3 times as long as the bract of 1-2 mm. *Calyx* adpressed-pubescent, or rarely the hairs spreading loosely, with dark (Type and others), light, or mixed hairs, 5-9 (Type 5) mm. long, the teeth 2-4 (Type 2) mm., usually a little shorter than the tube, the bracteoles about 1 mm. long, attached at its base. *Standard* nearly always a little broader than its length of 10-15 mm., narrowed gradually into a broad claw 2-4 mm. long; calli punctate when present, sometimes indistinct or partially fused, or less commonly quite absent as in the Type. *Wings* (Fig. 28b) usually 10-12 (Type 10, others to 15) mm. long, with a claw 2-5 mm. long, narrow near the often-ciliate auricle, nearly orbicular distally. *Keel* (Fig. 28c) obtuse with a strong sideways twist, usually 9-11 (Type 10.5, others to 14) mm. with a claw 3.5-6 mm. long, and two distinct pouches or deep folds, (rarely almost absent) near the auricle. *Ovary* (Fig. 28d) 4-6 mm. long at anthesis on a short stout gynophore under 1 mm. long, glabrous, hoary or closely adpressed-pubescent on the sides, with a broad band of longer, more spreading hairs along the suture. *Style* strongly flattened and broad at the base, its curvature sickle-like or semicircular, the tip (Fig. 28d, e) incurved or broadly hooked, as in the Type and most commonly, or geniculate to recurved, the beard long and dense, chiefly developed in a small area near the tip. *Fruit* cylindrical with a deeply intruded suture, the broadened base of the style persisting often as a short beak, usually 15-30 mm. long, 3-4 mm. in diameter, downy when young, finely reticulate and glabrescent with age. Said to be "a good fodder" (Koch 248).



Figs. 28a-e. *S. stipularis* var. *stipularis* : 28a. base of standard with punctate calli ; 28b. wing ; 28c. keel with deep folds ; 28d. pistil with broadly hooked style tip ; 28e. other forms taken by the style tip. (All x 3.5.)

DISTRIBUTION: See Map 11, derived from the Type and the following specimens:—

Queensland: Between the Paroot (Paroo R.) and Grey Ra., Morton, 1881; Between Stokes Ra. and Cooper's Ck., Wheeler; Stokes Ra., Victorian Expedition; MEL.



New South Wales: Milparinka, Bauerlen, 12.1897, *616*; NSW. Mt. Poole, Bauerlen 278; Yantara Lake, Bauerlen 386; Evelyn Ck., N. of and near Barrier Ra., A. King, 1887; MEL. Fowler's Gap to Packsaddle, Beadle and Brough, 27.8.1939; SYD. Near Fowler's Gap, Beadle, 27.8.1939, *622*; NSW. Barrier Ra., Irvine, 1889; Silverton, Porter, 1884, MEL. Broken Hill and Tarrawingee, Deane, 8.1893, *619*; NSW. 15 miles N. of Broken Hill, Beadle and Brough, 27.8.1939; SYD. Broken Hill, A. Morris 348, 2.9.1920, *620* (dup. JMB); do., Cheel, 8.1926, *628*; NSW.

South Australia: Mt. Kingston, J. Macd. Stuart; Peake R., E. C. Kempe, 1887; Lake Eyre, Lewis; S. of Charlotte Waters near Mt. Hamilton, Dittrich 13, 1885; MEL. Beresford (far North), Ising, 21.8.1931; JMB. Curdimurka, (Cleland), 17.8.1931; JBC. Lake Harry near Hergott, Gill, 1905, *626*; NSW. Lake Blanche, S. A. White, 19.9.1916; Mt. Hopeless, S. A. White, 17.9.1916; JMB. Mt. Lyndhurst, Koch 248, 8.1899 (dup. NSW *617*); AD. Leigh's Ck. (now Copley), (J. M. Black), 15.10.1918; JMB. Between Flinders Ra. and L. Torrens, Richards; Beltana, Richards, 8.1887; MEL. Arcoona, Murray 115, 21.8.1927; Yeltacowie, Murray 72, 7.1927; Torrens Plain, 28.8.1883; AD. Ediowie, per Agric. Bureau S.A., 10.1897, *624;* NSW. Flinders Ra., MEL. Hawker, (Cleland), 16.8.1921; JBC. do., (J. M. Black), 3.10.1916; JMB. Hawker and Quorn, Crocker, 18.9.1939, *4576*; ADW. Boolcoomatta, A. Morris 1452, 22.8.1926, *625*; NSW. Pitchi Ritchi Pass near Quorn, (Cleland), 28.8.1922; Quorn, (Cleland), 2.9.1941; do., (Cleland), 14.8.1921; do., (Cleland), 3.10.1945; JBC. Near Spencer's Gulf, Lattorf, 1881; Wirrabara Forest, Gill, 8.1889; Towards Spencer's Gulf, Warburton; Northern part of Yorke's Peninsula, Salmon, 1869; MEL. Freeling, Herb. Tate, 9.9.1881; Wasley's, Herb. Tate, 23.9.1881; AD. Kalkabury, Yorke's Peninsula, Tepper 764, 1.1880; Near Gawler Town, barren plains near St. Vincent's Gulf, Mueller, 1848; MEL. Roseworthy, *scripsit* Osborn, 8.1915; AD.

β var. **purpurea**, var. nov.

HOLOTYPE: S.D.E. Camp 41, S.A., 28.7.1939 (Lat. 27°50′S., Long. 137°30′E., between the Warburton R. and Lake Eyre); AD.

Differs from var. *stipularis* chiefly in the purple flower colour, though this may not be constant, the less strongly twisted, or almost straight keel, the style tip which seems always to be incurved to recurved, and essentially in the longitudinal folds or ridges on the standard in place of the punctate calli of var. *stipularis.* The leaves are very variable, giving some specimens exactly the same aspect as that of var. *stipularis* while others have narrower, more oblong leaflets. Stipule form seems to be correlated with leaflet-form, and varies from large and toothed, to smaller and entire when the leaflets are narrow. One specimen with a strong resemblance to var. *stipularis* has a flower colour when dry strongly suggestive of that group, but this is inconclusive as there are no relevant collector's notes. In the shape of the wings some specimens resemble var. *stipularis* and others var. *longialata,* but these resemblances are not correlated with those of the leaves and stipules. In its keel shape var. *purpurea* is closer to var. *stipularis* and though difficult to distinguish in some pressed specimens, seems always to have a slight twist, which is stronger in var. *stipularis* and indistinct or absent in var. *longialata.*

Ab var. *stipularis* in floribus purpureis, in carina non palam torsa, in styli apice semper incurva vel recurva et praecipue in sinibus duobus in vexilli ungue, non callis punctatis, differt.

DISTRIBUTION: See Map 11, derived from the Type and the following specimens:

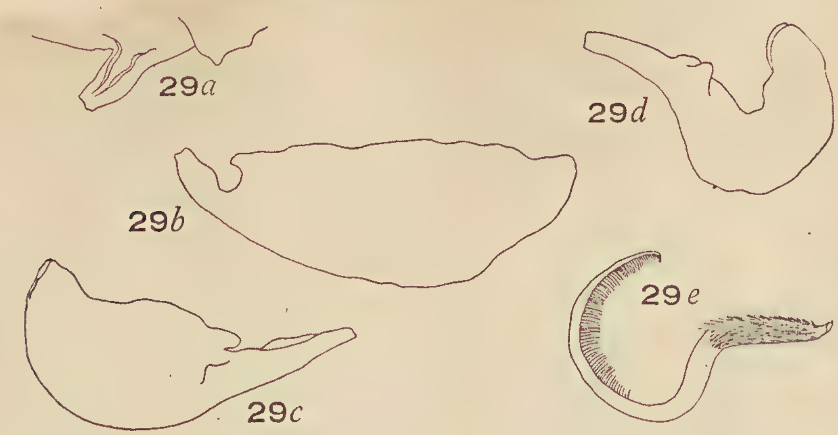
New South Wales: Coombah, A. Morris 1409, 19.9.1925, *615*; NSW.

South Australia: Lake Eyre, Rogers, 2.9.1910, *614*; NSW. Hawker, E. Eardley, 1934, *1399*; ADW. Also, not located: Mt. Parry (Herb. Tate); AD.

γ. var. **longialata,** var. nov.

HOLOTYPE: Bulloo Overflow in N.S.W., Beadle, 12.8.1941, *613*; NSW.

This group is distinguished chiefly by its long broad wings, and differs essentially from var. *stipularis* in the longitudinal folds on the standard (Fig. 29a), and in the keel not always distinctly twisted, as in var. *purpurea,* and from the latter group



Figs. 29a-e. S. *stipularis* var. *longialata* : 29a. base of standard with longitudinal folds ; 29b. wing ; 29c, d. keels from two different plants ; 29e pistil from 29d. (All x 3.5.)

often in the wing size and shape (Fig. 29b), and in a slight, but apparently constant difference in keel shape, this structure being narrower throughout, with a narrow, obtuse tip (Fig. 29c, d). See also Fig. 29e (pistil).

Ab var. *stipularis* in sinibus in vexilli ungue, in carina non palam torsa et in floribus purpureis ut in var. *purpurea* differt. Ab var. *purpurea* in alis longioribus et latis et in carina angusto-obtusa differt.

DISTRIBUTION: See Map 11, derived from the Type and the following specimens:—

New South Wales: Yantara Lake, Bauerlen 403; Cobham Salt Lake, Bauerlen 476, 1.1888; MEL.

South Australia: W. beyond Mt. Margaret, Babbage, 1871; Between Youldeh (now Ooldea) and Ouldabinna, Young; MEL.

Western Australia: Near Lake Austin, S. H. King, 1886; MEL. E. from Laverton, Clarke, 1916; Pike Hill, Glenorn Station, Malcolm, Burbidge 161, 25.8.1935; PERTH.

Thus in this species var. *purpurea* exhibits some characters of the two other varieties, though there is no smooth intergradation between the three. This may, however, be an apparent condition only, as relatively few specimens of var. *purpurea* and var. *longialata* have been collected, and the systematic treatment may need to be revised when more is known about the species and its behaviour.

THE OCCIDENTALIS GROUP.

S. gracilis and *S. occidentalis.*

S. gracilis is known from a single specimen, but from this limited representation, it seems to be a miniature replica of *S. occidentalis,* so far as can be seen from the single specimen known. The twisted, narrow-obtuse keel, the standard calli, the style tip, the pubescence and toothed stipules are reproduced in both. The flowers in *S. occidentalis* range from 9-11 mm. in length, while in *S. gracilis* they are only 5 mm. long. The petals and pistil are proportionately smaller in the latter species. A similar case of replication on a small scale is shown by *S. minutiflora* and *S. microcalyx* which are very similar in details except for the smaller size of the former. It is significant that *S. gracilis* and *S. minutiflora* are represented by a single specimen each, but the size difference is so strong that it is considered best to maintain the specific rank of *S. gracilis* and treat *S. minutiflora* similarly.

Among eastern species, this group shows some strong resemblances to the next pair of species, *S. campylantha* and *S. Murrayana.* These are, chiefly, the twisted keel, strongly flattened style base, and hooked style tip; there are considerable differences in pubescence, stipules, fruits and leaflet number between the groups.

31. **S. gracilis** Benth., Fl. Aust. 2: 220, 1864.

HOLOTYPE, by monotypy: Murchison R., W.A., Oldfield; MEL.

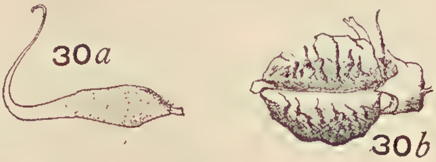
A small, decumbent plant with stems spreading to about 30 cm., glabrous except for a very few slightly flattened, white, basifixed hairs on the young stems, and short, dark hairs on the pedicels. *Leaves* 3-6 cm. long with 13-15 leaflets. *Leaflets* oblanceolate or narrow-oblanceolate, retuse with rather acute lobes, 2-4.5 mm. long, about 1.5 mm. broad, almost glabrous. *Stipules* leaf-like in texture, toothed, glabrous inside and out, up to 3 mm. long and broad. *Racemes* 6-10 cm. long with 4 flowers or less near the apex, the peduncles slender, almost or quite glabrous. *Flowers* very small, bluish-purple on drying, 5 mm. long on a pedicel of 1 mm. hirsute with short dark hairs, in the axil of a minute, sheathing, membranous bract. *Calyx* narrowed gradually to the base, glabrous or almost so, 3 mm. long, the teeth as long as or slightly shorter than the tube, the bracteoles at its base minute. *Standard* about 6 mm. long and broad, the claw 2 mm. long with two minute calli above it. *Wings* 6 mm. long, the claw 2.5 mm. *Keel* with a narrow, obtuse, almost rostrate tip, twisted sideways, 5 mm. long, the claw almost 3 mm. *Ovary* glabrous except for a small patch of white hairs on the suture at the base, only about 1.5 mm. long at anthesis, on a slender gynophore almost as long. *Style* flattened at the base, and as broad as the ovary itself, twisted inside the keel, the tip inflexed to hooked, the beard chiefly in the upper part. *Fruit* seen only in very young stages, when there are indications of developing ridges or wrinkles.

DISTRIBUTION: See Map 12; known only from the Type collection.

32. **S. occidentalis** F. Muell., Fragm. Phyt. Aust. 3 (19): 46, July, 1862.

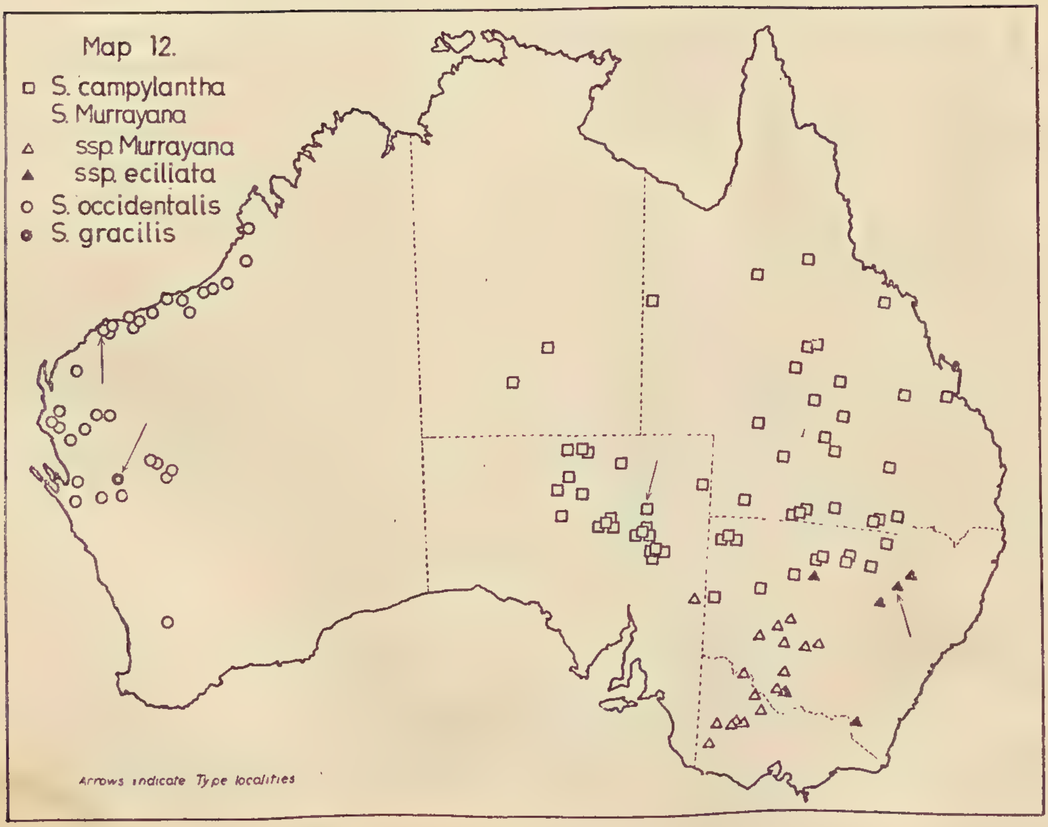
HOLOTYPE, by monotypy: Nichol Bay, W.A., Pemberton Walcott; MEL.

EQUIVALENT SYNONYM: *Diplolobium Walcottii* F. Muell., Trans. Bot. Soc. Edin. 7: 489,1863. *Holotype*, by monotypy: Nichol Bay, Walcott, "Trefoil, blossom purple"; MEL. (a specimen consisting of seeds and fruits only collected by Pemberton Walcott and Maitland Brown during F. Gregory's Exploring Expedition into North-Western Australia in 1861.)



Figs. 30a., b. *S. occidentalis*: 30a. pistil with hairs near base of ovary suture (x 3.5) ; 30b. pod (x 1,75.)

Small or spreading, prostrate or ascending plants under 10 cm. high, or with spreading stems over 30 cm. long, robust in large plants, clothed with a rather sparse pubescence of short, adpressed, slightly flattened, basifixed hairs, glabrescent. *Leaves* usually with 11-15 leaflets and about 3-7.5 cm. long. *Leaflets* elliptical to narrow-ovate or narrow-obovate, the apex truncate or retuse with a small point, 5-23 mm. x 2-10 mm. gradually shorter towards the leaf apex, the terminal the shortest, glabrous above, sparsely pubescent on the underside. *Stipules* narrow- to broad-deltoid, the larger ones with a few teeth or undulate margins, entire when smaller, green and leaf-like, up to 7mm. long, the few hairs chiefly on the inside. *Raceme* up to 22 cm. long with up to 25 flowers in the upper half or less, the peduncle sprinkled with a few hairs. *Flowers* rich violet (*fide* C. A. Gardner, 2525A), 9-11 mm. long on a slender pedicel rather densely pubescent with often dark hairs, exceeding the small sheathing bract 1-1.5 mm. long. *Calyx* usually 4-4.5 mm. long, the narrow-deltoid teeth 1.5-2 mm., sparsely pubescent or glabrous with a fringe of rather stiff hairs around the teeth especially in the sinuses between them, bracteoles under 1 mm. long attached on the calyx base or sometimes high on the pedicel. *Standard* broadly expanded and usually a little broader (9-13 mm.) than long (8-10 mm.), the claw slender, 2.5-3 mm. long, with two vertical ridges close together above it. *Wings* 8-11 mm., the claw 2.5-3.5 mm. long. *Keel*, without any pouches or folds, 7-8.5 mm. long, the claw 3.5-4 mm., the tip narrowly obtuse and with a sharp twist sideways. *Ovary* (Fig. 30a) glabrous except for a band of fine, stiff, white hairs along the base of the suture, 2.5-3 mm. long on a slender gynophore 1-1.5 mm. long at anthesis, elongating to about 2 mm. in



the fruit. *Style* (Fig. 30a) much flattened at the base, the tip hooked, the beard dense, in the upper part especially near the hooked tip. *Fruit* (Fig. 30b) rotund or almost orbicular in outline, somewhat flattened, about 6-10 mm. x 4-6 mm., the wall very firm and rather thick with very prominent, reticulate veins, the suture intruded to the base of the loculus, retaining the short band of hairs at its base.

DISTRIBUTION: See Map 12, derived from the Type and the following specimens:—

Western Australia: Broome, Mjöberg, 7.1911, *633*; NW Australia, Crawford 90, 1909, *634*; Pardoo, H. F. C. Davis, 26.5.1943, *632*; NSW. Pardoo Ck., De Grey R., Burbidge 1530, 24.7.1941; De Grey Station, Burbidge 1579, 28.7.1941; Nalgi Stn., 80 mile beach, Burbidge 1364, 8.7.1941; PERTH. Between De Grey R. and Lagrange Bay, A. Forrest and T. Carey, 1879; Point Larrey, Hughan; MEL. Port Hedland, Mjöberg, 11.8.1911, *631*; Pt. Sampson, Cleland, 7.1907, *629*; NSW. Nicol Bay and De Grey R., Ridley's Expedition, 12.1863; Near Roebourne, F. S. Carey, 8.1884; Nichol Bay, Walcott (with Brown, 1861); Yule and Sherlock Rs., J. Forrest, 1878; Ashburton R., Stoward 3, 3.11.1911; MEL. Wandagee, Minilya R., Gardner 3210, 29.8.1932; PERTH. Between Gascoyne R. and C. Farquhar, Survey Expedition, 1883 (*bis*); Gascoyne R., J. Forrest, 1882; do., Gribble, 1886; MEL. do., J. Forrest (1), *630*; NSW. Boologooro Stn., Gascoyne R., Gardner 3180, 27.8.1937; PERTH. Gascoyne R., Pollack, 1882; Near Mt. Hale, Upper Murchison R., Crossland 3, 1884 (*bis*); do., Carr, 1877; MEL. Tamala Station, Hamelin Pool, Roberts, 8.1937; PERTH. Murchison R., Oldfield (1); MEL. Meekatharra, Gardner, 8.1927; PERTH. Lake Annean, ex herb. W. V. Fitzgerald, 9.1903, *635*; NSW. Between Northampton and Shark Bay, S. Carey, 1884; MEL. Sanford R., Murgoo, Gardner 2525A, 23.8.1931; PERTH. Upper Swan R., Eaton (2), 1888; MEL.

ILLUSTRATION: Curtis's Bot. Mag. **91** t. 5490, 1865.

THE CAMPYLANTHA GROUP.

S. campylantha and *S. Murrayana.*

This pair of species constitutes an *Artenkreis,* while *S. Murrayana* itself is a *Rassenkreis* of two members, a northern and a southern subspecies. There is complete discontinuity between the species, both phenotypically and geographically, though they occur in adjacent areas. Resemblances in details like petal shape, as well as the more usual structures, are striking, but the two species are readily distinguished according to Table IX.

TABLE IX.

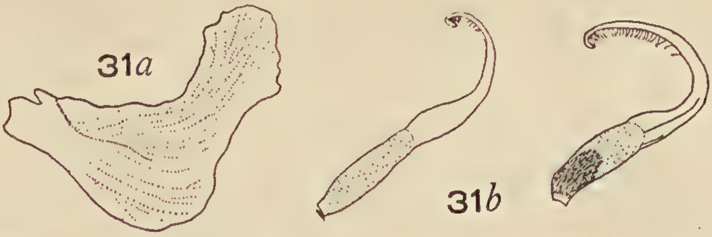
Species.	Pubescence.	Leaflets.	Wings.	Calyx.
S. campylantha ...	None	Linear acute to lanceolate or elliptical.	Distinctly bent at the middle, 8–11 mm. long; auricle glabrous (fig. 31a).	Without any twist.
S. Murrayana ssp. *Murrayana.*	Silky meditrichous.	Linear	Slightly bent near the middle, 8–10 mm. long; auricle woolly and ciliate (fig. 32d).	With a slight but definite twist at the base (fig. 32b).
S. Murrayana ssp. *eciliata.*	do ...	do ...	Auricle glabrous, otherwise like the last.	do

33. **S. campylantha** F. Muell. apud A. C. Gregory, N.S.W. Legislative Assembly, Votes and Proc. 2: 6, 1858/9.

Holotype, by monotypy: (On plains along) Cooper's R., S.A.-Qd., A. C. Gregory; MEL. (?*Haptotype* K not seen).

Equivalent Synonym: *S. fragilis* F. M. Bailey, Qd. Agric. J. **25**: 286, 1910. *Holotype* by monotypy: Georgina R., Qd., Bick, 11.1910; BRI.

Decumbent and weak-stemmed to rather rigid and suberect herbs, with stems up to 60 cm. long, glabrous except for a few scattered basifixed hairs. *Leaves* 2-7 mm. (usually 3-5 mm.) long with 3-7 distant leaflets. *Leaflets* linear-acute to lanceolate or elliptical, the apex rarely rounded or subobtuse, the terminal leaflet up to 45 mm. x 4.5 mm., distinctly longer than the adjacent laterals which are mostly 10-25 mm. x 2-4 mm. *Stipules* very small, linear or deltoid up to 2 mm. long, easily deciduous.



Figs. 31a, b. *S. campylantha* : 31a. wing, bent at middle ; 31b. pistil showing ovary glabrous and partly pubescent. (Both x 3.5.)

Raceme commonly 7-10 cm. long with few flowers (3-14) occupying one-half of this length or less. *Flower* pinkish-purple, purple or purple-blue (*fide* collectors' notes), 7-8 mm. long on a slender pedicel 3-4 mm. long in the axil of a small narrow subscarious bract usually not more than 1 mm. long. *Calyx* 4-5.5 mm. long, the teeth pubescent inside, 1.5-2.5 mm. long, not longer than the tube, with a pair of bracteoles of less than 1 mm. *Standard* expanded, distinctly broader (10-15 mm.) than long (7-10.5 mm.), with a short claw of 1.5-2 mm., sometimes slightly thickened but not forming distinct calli. *Wings* (Fig. 31a) with a distinct bend about the middle, the apex somewhat expanded, 8-11 mm. long with a short claw 1-1.5 mm. long. *Keel* obtuse, twisted sideways (sometimes indistinctly in pressed specimens), commonly 7-8 mm. long, the claw 3.5 mm., usually with a pair of folds near the auricle. *Ovary* (Fig. 31b) densely (as in the Type and others) or rather scantily adpressed-pubescent with silky white hairs or sometimes quite glabrous, 3-4 mm. long on a very short gynophore at anthesis. *Style* (Fig. 31b) incurved with a hooked or incurved tip, bearded chiefly in the upper part, much flattened below, straw-coloured and apparently articulate with the dark reddish-brown ovary (at least in old flowers). *Fruit* very variable in length, 10-80 mm. long, tapered into a stalk-like base up to 10 mm. long in the longest fruit, 3-4 mm. in diameter, the suture intruded about half-way to the base.

Distribution: See Map 12, derived from the Type and the following specimens:—

Northern Territory: Edward Ck., (Cleland), 31.12.1926 (dup. JMB); JBC. Finke R., S.A., H. Kempe, 1889; MEL.

Queensland: Bowen R., Bowman 245 (*bis*, without number); MEL. About 90 miles N. of Hughenden, Lake Louisa, Burke district, Blake 8600, 12.4.1935 (dup. NSW. *638*); Tarbrax Stn., about 30 miles S. of Maxwellton, Burke district, Blake 12405, 28.7.1936 (dup. NSW. *637*); STB. Georgina R., Bick, 11.1910; BRI. Bowen's Downs, Birch; Muttaburra, Bowen Downs; MEL. Darr R., Birch; BRI. Jericho, Upper Barcoo, Walker, 1890; Gracemere, Bowman 6, 1867; Comet R., O'Shanesy 5007; MEL. Mitchell district: Malvern Hills, Everist 2042, 5.3.1940; BRI. Tambo, Barcoo R., Wirth, 1874; MEL. Near (E. of) Windorah, Gregory Sth. district, Blake 12045, 10.7.1936; STB. Yuanda Stn., Pentland, Johnson, 8.1897; Charlesville, Giles, 4.1869; MEL. Muckadilla, Trenouth 18, 5.1894; Quilpie, C. T. White, 20.5.1928; between Nockatunga and N.S.W. border, Allison ex herb. A. Morris 1090 (4800/16.1.1923); BRI. Noondoo near Dirranbandi, Maranoa district, Blake 10682, 4.3.1936 (dup. NSW. *678*); Avondale, SE of Cunnamulla, Warrego district, Blake 11711, 21.6.1936; STB. Caiwarro, Cotter; MEL. do., Eulo, K. I. Morris 9, 30.8.1936; Wittenburra Stn., 36 miles S. of Eulo, Everist and Smith 24, 6.1.1937; BRI. Ballandool R., Locker 47; Curriwillighi, Dalton 77; MEL.

New South Wales: Upper Darling R. near Q'land border, Henry, 1884; MEL. Milparinka, de Beuzeville 151, 11.1939, *648*; Mt. Browne, Corbett, 4.1898, *641*; Bancanya, A. Morris 748, 25.9.1921 (dup. BRI), *636*; Brewarrina, Boorman, 11.1903, *644*; Bourke, Boorman, 9.1912, *643*; Warraweena, Bourke, Morrison, 26.3.1921, *639*; Tarcoon, Boorman, 11.1903, *647*; Near Carinya (near Quambone), Beadle, 2.1943, *642*; NSW. Darling R., Bauerlen, 1.1888; Wilcannia, Kennedy, 1885 (dup. NSW. *646* without date); MEL. Near Broken Hill, A. Morris, 6.1921; JMB.

South Australia: Bagot Ra., J. M. Stuart (*bis*); MEL. Dalhousie, N. of Oodnadatta, S. A. White, 10.8.1913; do., near Oodnadatta, 21.7.1921; JMB. N. of L. Eyre, Newland 80, 6.1887; MEL. Flooded flats of Neale's R., Ising, 7.9.1931; Strzelecki Ck., near Innamincka, 28.9.1916; JMB. Arkaringa Ck., R. Helms (E.E.E.), 13.5.1891 (dup. MEL); AD. Peake R., E. C. Kempe, 1887; MEL. East Well near Coober Pedy, Andrewartha, 27.4.1938, *3055*; ADW. Beresford, (Cleland), 22.8.1933 (dup. JMB); Anna Ck., (Cleland), 10.9.1030; Coward Springs, (Cleland), 10.9.1930; JBC. Beresford crabholes (Herb. Tate); AD. Wangianna, (Cleland), 4.9.1941 (*bis*); Wangianna N. of Marree, (Cleland), 7.8.1931 (dup. JMB); JBC. Wangianna, Far North, Ising, 21.8.1931; Hergott Waterhole, 13.10.1917; JMB. Mt. Lyndhurst, Koch 132, 8.1898; BRI. do., Koch 132, 8.1899, *640*; do., Koch 132, 9.1898 (dup. MEL, AD), *645*; NSW. Devil's Village near Mt. Lyndhurst, 15.9.1916; JMB.

Also, not located: Liparinga, Fitzroy Road, Ewart, 4.1927; PERTH.

Illustration: F. M. Bailey, Compr. Cat. Queensland Pl.: 134 fig. 111 *ter*, 1909-13 (*sub S. fragilis*), and (the same plate) Qd. Agric. J. **25** t. 28, 1910 (*sub S. fragilis*).

34. **S. Murrayana** Wawra, Ost. bot. Z. 31: 69, 1881.

A supplementary description with illustrations of the same specimen was published in a book by the same author: Itinera principum Saxe-Coburgi:—Die Botanische Ausbeute von den Reisen der Prinzen von Saxe-achen-Coburg Gotha 2. Reise der Prinzen August und Ferdinand nach Brasilien 1879: 6-7, Tab. 1 Fig. A. 1-6; Vienna 1883-88.

HOLOTYPE, not seen, location not known: "Australia, on the Murray; Coll. I (i.e. the "Weltreise" collection) 429b."

TYPE SUBSPECIES: *S. Murrayana* ssp. *Murrayana.*

Rather small, ascending plants with an adpressed pubescence of medifixed, silky hairs, the leaves with usually 5-7 linear leaflets, the terminal distinctly longer than the laterals; stipules narrow; raceme with usually only a few bright pink flowers on slender, black-haired pedicels; calyx pubescent with dark hairs and showing a slight but distinct twist where it joins the pedicel; standard with or without a pair of longitudinal folds at the base, often asymmetrical; wings rather bent near the middle, the auricle densely ciliate and woolly in one subspecies; keel twisted sideways, nearly always without folds near the claw; ovary adpressed-pubescent often with a band of darker hairs along the suture; style very broad at the base and slightly constricted at its junction with the ovary, the tip sharply and minutely hooked.

KEY TO THE SUBSPECIES.

Auricles of the wings ciliate and woolly with crinkled hairs; standard tapering rather gradually into the claw, the breadth less or not greater than the length .. a. ssp. *Murrayana.*

Auricles of the wings without hairs; standard distinctly broader than long, sharply contracted into the claw .... b. ssp. *eciliata.*

a. ssp. **Murrayana** (Wawra sensu orig.) comb. et stat. nov.

HOLOTYPE: as for the species.

ABSOLUTE SYNONYM: *S. Murrayana* Wawra sensu orig.

EQUIVALENT SYNONYM: *S. Morrisiana* J. M. Black, Trans. and Proc. Roy. Soc. S. Aust. **50**: 283, 1926. *Holotype* by monotypy: Boolcoomatta Stn. (north of Olary on Broken Hill Railway), A. Morris 1448, 22.8.1926; JMB, very fragmentary. (Haptotypes NSW *677*; MEL without the number).

Because of the unusually precise and detailed descriptions of the Type, and because the flowers have certain peculiarities, I have no hesitation in synonymising these two names even without examination of the Type of *S. Murrayana.* There is apparent disagreement in the two descriptions on one point, *S. Morrisiana* being described as "vexillo...ecalloso" and *S. Murrayana* as "vexillo...plicis duabus callosis," but this is explained by variability in the standard, which sometimes has two definite thickened folds above the claw though it is more often without them. The two characters stressed by Wawra, the woolly-ciliate wing-auricles and the long petal-claws are both shown by the type of *S. Morrisiana* though neither is mentioned in its description.

Small, ascending or suberect, usually slender, plants with stems 10-30 cm. long and a rather sparse pubescence of closely adpressed, medifixed, silky transparent hairs. *Leaves* 2-9 cm. long, but usually 4-7 cm., with 3-9 leaflets, usually 5-7 (3-5 in the Type). *Leaflets* linear-acute, glabrous above, sparsely to fairly densely pubescent below, the terminal distinctly longer than the adjacent laterals, sometimes twice as long (15-30 mm.), the lateral often 10-15 mm. *Stipules* narrow, subulate, 2-10 mm. long. *Raceme* often 10-15 cm. long with rather few flowers (3-8) in the upper one-fourth, the peduncles pubescent. *Flowers* pink, the standard with red stripes, darker at the base (*fide* original description) drying purplish, mostly 7-9 mm. long, on a slender pedicel 5-8 mm. long, densely covered with dark adpressed hairs and subtended by a bract 1-2 mm. long. *Calyx* (Fig. 32b) 4-5 mm. long, rather densely pubescent with loosely adpressed, dark brown (rarely pale or white) hairs, the teeth 1.5-2 mm., shorter than the tube; bracteoles 1 mm. long, attached to the base of the calyx, which has a slight but distinct spiral twist. *Standard* (Fig. 32a) narrower than long, usually 8-9 mm. x 10-11 mm., tapering gradually into the claw of 3-5 mm. without any calli or with two more or less distinct, thickened folds, often asymmetrical like the lamina. *Wings* (Fig. 32d) 8-10 mm. long, the claw 4-5 mm., the auricle ciliate with rather long, crinkled hairs. *Keel* (Fig. 32e) 7-10 mm. long with a twist to one side often obscure in pressed specimens, the claw 4-5 mm. long with or without a pair of folds near the claw. *Ovary* (Fig. 32c) densely adpressed-pubescent with white hairs except along the suture where the hairs are often dark, 3-4 mm. long at anthesis, on a very short gynophore. *Style* (Fig. 32c), firm, twisted with the keel, bearded rather densely in the upper half, the base distinctly flattened and with a slight constriction at its junction with the ovary, the tip sharply hooked, sometimes with a scarcely discernible tuft of very short hairs behind the hook. *Fruit,* immature on all specimens, but apparently as in ssp. *eciliata* (see below).

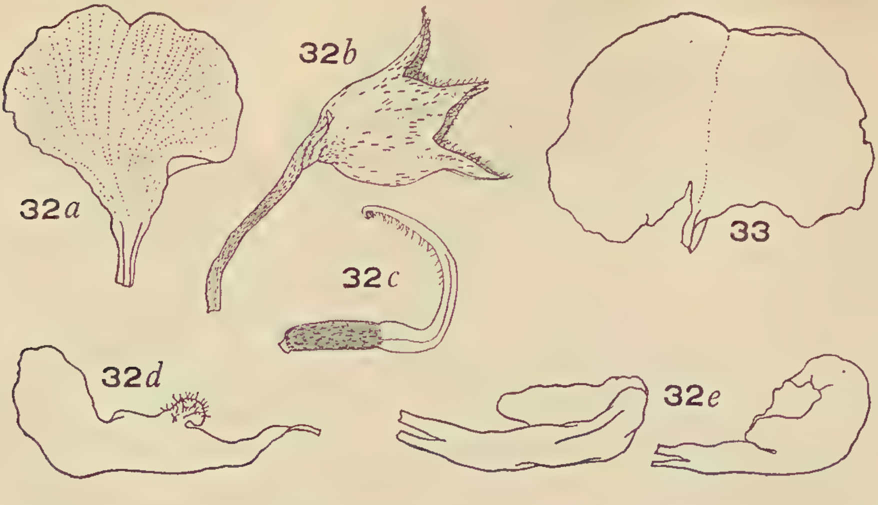
DISTRIBUTION: See Map 12, derived from the following specimens:—

New South Wales: Between the Lachlan and Darling Rs., Kuentz, 1885; between the Darling and Lachlan Rs., Burkitt, 1877; do., Brückner, 8.1885 (*bis*); Lower Edwards R., Mein; Hillston, Evans, 1889; Lachlan R., Mueller, 9.1878 (*ter*; dups. JMB, NSW *655*); MEL. Hay, Fletcher, 22.9.1889, *651* and *649*; Zara via Hay, Officer 200, 3.1904, *652*; NSW.

Victoria: Murray R. "forsan forma *S. phacifoliae*"; MEL. Swan Hill, Grummou or Gummou (*bis*); MEL. Kerang, Williamson, *654*; NSW. East Charlton, Lake Buloke, Beckler, 10.1899; Between the Wimmera and Richardson R., Curdie; Near Murtoa, Reader, 3.10.1895; Wimmera, Eckert, 1890; MEL. Wannon R., McLachlan (Williamson 1505), *653*; NSW.

South Australia: Boolcoomatta Stn., A. Morris 1448, 22.8.1926 (dups. BRI; NSW *677*; MEL. without the number); JMB.

ILLUSTRATION: Itin. Princ. S. Coburg 1 t. 1, 1883.



Figs. 32-33. *S. Murrayana* : Figs. 32a-e. ssp. *Murrayana* : 32a. standard ; 32b. calyx with slight twist at the base ; 32c. pistil with broad style base constricted at junction with ovary ; 32d. wing with ciliate auricle ; 32e. keel. Fig. 33. ssp. *eciliata* : standard. (All x 3.5.)

b. ssp. **eciliata** ssp. nov.

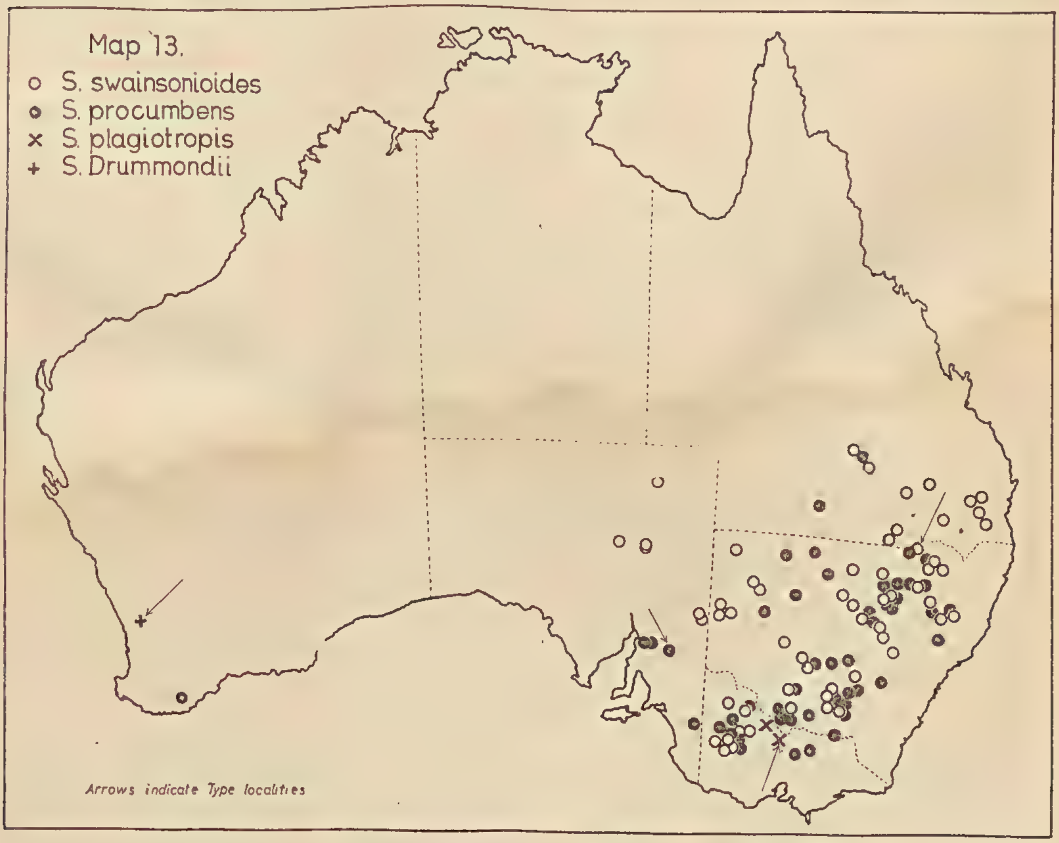
Holotype: Near Baradine, N.S.W., Witter, 11.1900, *657;* NSW. (Haptotype NSW *658*).

Differs from ssp. *Murrayana* in the absence of cilia on the wing auricles, and in the broadly expanded standard (Fig. 33) which is 11-12.5 mm. broad and 2-3 mm. shorter than the breadth, sharply contracted into the claw. There seems to be a tendency also for the leaflets to be fewer (commonly 3-5) and very narrow. Fruit hoary, tapered gradually at both ends, 15-35 mm. long, about 5 mm. in diameter, the suture deeply intruded.

Ab ssp. *Murrayana* in alarum auriculis glabris et in vexillo quam longo maxime latiore, differt. Foliola saepe 3-5, angustissima.

Distribution: See Map 12, derived from the Type and the following specimens:—

New South Wales: Narrabri, Betche, 17.10.1886, *662*; NSW. North Western New South Wales, Broughton, *ca* 1925; SYD. Gulargambone, Cadell, 9.1886, *660*; Zara, Wanganella, Officer, 12.1905, *659*; NSW. Tooma Rapids (mapped location in Australian Alps uncertain), Campbell; MEL.



THE SWAINSONIOIDES GROUP.

S. plagiotropis, S. procumbens, S. swainsonioides, and perhaps *S. Drummondii.*

No very close relationship is apparent between these species, though each shows a feature not seen elsewhere in *Swainsona*—a more or less attenuate, spirally twisted keel, the spiral being sometimes incomplete, but more distinct than the more common sideways-turned condition, because of the elongated petals.

S. procumbens and *S. swainsonioides* have been much confused in the past, one having been named as a variety of the other. Actually they are quite distinct and occur together over a wide area in eastern Australia without any signs of genetic confluence in over 150 specimens. Past confusion seems to have resulted from use of unreliable criteria in determination.

Since it exhibits the characters of the keel mentioned above, *S. plagiotropis*, a species which is apparently rare and localised in its occurrence, is placed with these species although its detailed structure is different from theirs and indeed from that of any other species in respect of its style beard.

S. Drummondii, of which the writer has seen only descriptions and a few sketches, and which is known only from the Type specimen, seems also to be close to them, though its place of origin is very distant from the present areas of occupation of the other species. In this respect the apparently authentic collection of *S. procumbens* from Mt. Barker, W.A., is also remarkable.

The distinguishing characters of the four species of this group are summarised in Table X.

TABLE X.

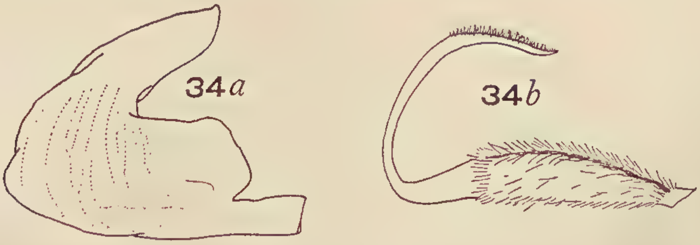
Species.	Keel.	Pubescence.	Standard.	Style Beard.
S. swainsonioides.	Coil incomplete, somewhat angular, tip of the petals concolorous with the base (fig. 35b).	Sparse to fairly dense; hairs fine, curved-spreading to loosely adpressed (fig. 35a).	Ecallose …………	Ventral, i.e., on the usual, inner side.
S. procumbens…	Coil complete, smoothly curved, the petals of the keel yellow-tipped (figs. 36b, c, d).	Usually sparse; hairs short straight, closely adpressed, rather coarse (fig. 36e).	With two thickened lines or folds (fig. 36a).	do
S. plagiotropis…	Curve scarcely more than a turn sideways, scythe-like (fig. 34a).	Of scattered loosely adpressed hairs, laterally attached at the base.	Ecallose or with very slightly thickened lines.	Dorsal (fig. 34b).
S. Drummondii	?	?	Ecallose …………	? Ventral ……

35. **S. plagiotropis** F. Muell., Fragm. Phyt. Aust. 9: 153, 1875.

HOLOTYPE, by monotypy: Campaspe R., Vic., 10.1875, *scripsit* F. Mueller (excluding the stalk marked, which is probably *S. Murrayana*); MEL. (*Haptotype* NSW *124.*)

Mueller's description of this species was drawn up almost entirely from the Holotype, but included a description of a fruit foreign to that specimen—"legumen unciale vel paulo longius . . ." In his collection is another sheet, "Lachlan R., 1878", named by him *S. plagiopteris* (ined.). This specimen and the adventive fruit on the Holotype sheet belong to *S. Murrayana* which at that time was undescribed, but it is uncertain whether Mueller meant "*S. plagiopteris*" to apply to *S. Murrayana* or whether it was an error for *S. plagiotropis* in which he had included the fruit of *S. Murrayana*. Another name, *S. camptopetala* (ined.) was also written by Mueller on a sheet of *S. plagiotropis* with uncertain data as to locality or collector.

Small, prostrate plants (*fide* A. Morris 1408), the stems up to 15 or 20 cm. long in the few specimens collected, clothed, chiefly on the leaves, with scattered, rather loosely adpressed hairs laterally attached at the base. *Leaves* about 10 cm. long with 17-23 leaflets. *Leaflets* very narrow- to narrow-elliptical, or narrow-lanceolate, 11-17 mm. long, 1.5-4 mm. broad, decreasing slightly towards the apex, more or less sparsely pubescent below, glabrous above. *Stipules* rather large, deltoid-acuminate, 5-8 mm. long, ciliate, glabrescent. *Raceme* 15-22 cm. long, with a glabrous peduncle and 2-4 flowers near the apex. Flower violet or bright red, 10-12 mm. long on a densely white-pubescent pedicel 3-5 mm. long, in the axil of a scarious, ovate, sheathing bract 3-4 mm. long, usually shorter than the pedicel. *Calyx* 7-7.5 mm. long, glabrous outside, the teeth pubescent inside and ciliate, acuminate, the shorter ones 2-3 mm. long, the longer 4 mm.; bracteoles like the bracts in shape, 1.5-2.5 mm. long, attached at the calyx base or high on the pedicel. *Standard* much broader than long, 18-20 mm. x 12-14 mm., tapering gradually to the base, without a distinct claw or with a claw only 1 mm. long; calli absent except for two poorly developed, thickened lines diverging from the base. *Wings* 10 mm. long, the claw 3 mm. and the auricle almost as long. *Keel* (Fig. 34a) subacute, 9-12 mm. with a claw 3.5 mm. long, the tip sharply incurved like the blade of a scythe, turned sideways or sometimes with a spiral twist if the apex is attenuate; folds or pouches absent. *Ovary* (Fig. 34b) densely adpressed-pubescent with pale or tawny hairs, about 6 mm. long at anthesis on a stout gynophore 1-1.5 mm. long. *Style* incurved with the keel, the upper one-third slightly thickened, with a dense beard (Fig. 34b) of sometimes coarse hairs dorsally (perhaps through a torsion of the style but apparently not always so), the tip, or the stigma only, minutely reflexed. *Fruit* rotund in outline, 13-17 mm. long, 9-10 mm. broad, the suture intruded in a broad groove, the pericarp pubescent with scattered hairs.



Figs. 34a, b. *S. plagiotropis* : 34a. keel ; 34b. pistil with dorsal style beard. (Both x 3.5.)

Distribution: See Map 13, derived from the Type and the following specimens:—

Victoria: Kerang, A. Morris 1408, 21.9.1925, *125*; NSW. Also a sheet with the label "*S. comptopetala* F.v.M. Vexill. plicatum. Alae curvatae flexuos. Pet. violacea. Oct. 1883." A second label "66, Louth and Bourke, Robberds" may be adventive; MEL.

Illustration: Maiden, Ill. N.S.W. Pl. **3**; t.29, 1911 (excluding Fig. F).

36. **S. swainsonioides** (Benth. in Mitch.) comb. nov.

Holotype, by monotypy, examined and reported on by V. S. Summerhayes, not seen: "Sub-Tropical New Holland, Lieut.-Col. T. L. Mitchell 1846. Dec. 10, 482 Fl. blue, on Downs No. 463"; K. This station was in the vicinity of what is now Mungindi, N.S.W.

Absolute Synonym: *Cyclogyne swainsonioides* Benth. in Mitchell, Jour. of an Expedition into the Interior of Tropical Australia: 397, 1884.

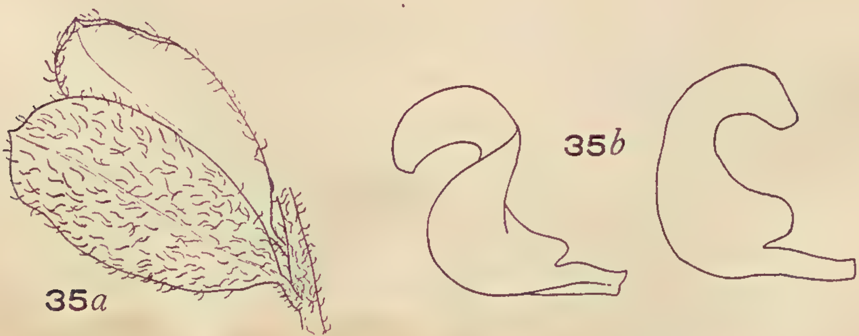
tr./

Equivalent Synonyms: *S. procumbens* var. ? *minor* Benth., Fl. Aust. **2**: 220, 1846. *Holotype* by monotypy: Wimmera, (Dallachy), inscribed "38 Swainsonia Walmar (or Watmar), 18 Sept. '62, Plains, common"; MEL. (*Haptotype* NSW *123*).

S. oncinotropis F. Muell., Australasian Chem. & Drugg. **7**: 45, 1884. *Lectotype*: Holotype of *S. procumbens* var. *minor* above.

Examination of the type of *Cyclogyne swainsonioides* by Mr. Summerhayes at Kew and comparison of specimens sent from this Herbarium, indicate that Mueller was in error when he synonymised this name with his *Cyclogyne procumbens*, an error which has been continued in subsequent Australian literature. There is a general tendency in the population represented below for plants growing in the northern part of the range to have longer and relatively narrower leaflets with acute apices, and larger flowers. Thus the groups cited above as equivalent synonyms for *S. swainsonioides* are conspecific with, but not a good match for, the Type of that species.

Plants of varying size and habit, at first weakly ascending, finally with several stems radiating from a central tap root, forming, when well grown, more or less dense clumps up to 1 m. in diameter and about 0.6 m. in height; stems in small plants sometimes under 15 cm. long; pubescence sparse to moderately dense, the hairs fine, white, basifixed, curved-spreading to loosely adpressed. *Leaves* up to 15 cm. long, the leaflets in larger leaves widely spaced, usually about 17 (11-21). *Leaflets* very variable in size and shape, 5 to more than 30 mm. long, 2-12 mm. broad; in some narrow-obovate to almost cuneate with a point, 5-10 mm. x 2-5 mm.; in others broad-elliptical up to 12 mm. long, the apex obtuse, or longer and relatively narrower (oblanceolate or narrow-obovate), narrow- to very narrow-elliptical-obtuse, or narrow-oblong to almost cultrate, moderately to sparsely pubescent below, glabrous above (Fig. 35a). *Stipules* large, green at first, later almost scarious, deltoid or acuminate from a broad base, pubescent on both sides, up to 1.5 cm. long, (7 mm. in the Type).



Figs. 35a, b. *S. swainsonioides* : 35a. leaflets ; 35b. keel—two characteristic shapes in pressed specimens. (All x 3.5.)

Racemes from 10 cm. in the Type and other small plants to over 30 cm. long in large plants, the peduncle proportionately robust, glabrous or with a few hairs, with 6-15 flowers occupying about one-third of the length. *Flower* blue to purple, very variable in size, 8-15 mm. long, on a pedicel of about 5 mm. often dark coloured with white hairs, in the axil of a rather broad, sheathing subscarious bract of about the same length as the pedicel. *Calyx* 5-7 mm. long, pubescent or almost glabrous, the hairs always white or pale, the teeth 2.5-4 mm. long, usually about equal to the tube; bracteoles narrow-ovate, scarious, 1-2.5 mm. long, rather long-ciliate or pubescent. *Standard* distinctly broader than long and often very broad, 9-22 mm. (commonly 11-15 mm.) broad, 6-16 mm. long with a rather broad claw only 1.5 mm. long and a conspicuous notch, without calli except, occasionally, two slightly thickened divergent lines above the claw. *Wings* obtuse, commonly 8-11 mm. with a claw 1-3 mm. long. *Keel* (Fig. 35b) with a distinct but incomplete spiral twist; in pressed specimens the keel characteristically assumes one of two shapes: (i) the spiral is flattened into one plane following three sides of a rounded rectangle, the sides measuring (from the apex) approximately 3-5 mm., 5-11 mm. and 5-10 mm., or (ii) the tip of the spiral is twisted back and the keel assumes an S-shape; tip obtuse, narrow but not attenuate nor yellow as it is in *S. procumbens*; claw 3-4 mm. long without pouches or folds above it. *Ovary* densely pubescent with adpressed hairs, about 3-4.5 mm. long at anthesis, on a stout gynophore of 0.5 mm. *Style* very slender except near the base, elongate within the keel, bearded only in the apical 2-4 mm., the tip hooked or incurved. *Fruit* straight or slightly upturned at the tip, narrow-ellipsoidal, the pericarp firm and rather thick, hoary with sparse, curly hairs, scarcely reticulate but sometimes wrinkled, the suture intruded to the base.

Said to be always, or very commonly, an inhabitant of heavy black and chocolate soils.

DISTRIBUTION: See Map 13, derived from the Type and representative localities among the following specimens:—

Queensland: Augathella, Gildea, 23.8.1924; BRI. Warrego district: Morven, Blake 10994, 2.4.1936 (dup. NSW *1*); STB. Dulacca, J. White, 9.1914; Maranoa, F. M. Bailey; Near Bowenville, Smith and Everist 789, 13.10.1940 (*bis.*; dup., NSW *27*); Bell, Downes, 27.9.1927; Jondaeyan, Nixon, 9.1930; E. Greenmount, Ramsay, 15.9.1930; Darling Downs, Bancroft; BRI. Noondoo near Dirranbandi, Maranoa district, Blake 10681, 4.3.1936; STB. Near L. Bokhara, Hebet district, Roe, 1.10.1940, *2*; NSW.

New South Wales: Moree, Hill, 9.1938, *4*; Moree per Irrigation Farm, 2.1905 (*bis*), *5*; and *3*; Gurley Siding, Ferth, 9.1913, *6*; Gunyerwarildi near Warialda, Rupp, 9.10.1916, *7*; Warialda, Woollett, *8*; Warialda, Kirk, 8.1914, *9*; do., Boorman, 9.1910, *11*; do., Boorman, 10.1914 (dup. BRI), *10*; do., Cheel, 29.7.1929, *12*; Yandama Stn., Milparinka, Collier, 10.1910, *13*; Mt. Mitchell, Warialda, Loder, 5.9.1920, *14*; Brewarrina, Boorman, 11.1903, *15*; Walgett, Seymour, 9.1916, *16*; do., G.V.R.S., 4.9.1939, *17*; do., G.V.R.S., 9.3.1943, *18*; and *19*; Narrabri, G.V.R.S., 15.8.1939, *20*; do., Betche, 6.10.1886, *39*; near Baradine, Witter "A", 11.1900, *26*; Gunnedah, Boorman, 9.1908, *25*; do., Boorman, 9.1910, *38*; NSW. Coonamble, 12.8.1912; AD. Coonamble, G.V.R.S., 12.9.1939, *21*; do., Breakwell, 8.1912, *22*; White Cliffs, Farrell, 7.1914, *29*; Coolabah, Peacock, 1900, *28*; do., per Nyngan Demonstration Farm, 5.1914, *30*; Victoria Hotel, Beadle, 9.1939, *31*; near Girilambone, Mullen, 1916, *32*; Moredevil, Co. Pottinger, Burrows, 10.1918, *34*; Duri Road, Tamworth, Rupp 5, 10.1903, *35*; Tamworth, Rupp. 10.1904, *36*; Werris Crk., Boorman, 9.1910, *37*; Kickerbell Stn., Pine Ridge, Budges 2, 28.2.1911, *33*; 30 miles from Broken Hill, A. Morris 542, 4.1921, *40*; Nyngan, 10.1936, *41*; do., Ament, 9.1936, *42*; Nevertire, A. Morris 1195, 23.9.1924, *45*; 45 miles E. of Broken Hill, Cleland, 1.4.1917, *43*; Broken Hill, Andrews, 9.1918, *44*; NSW. Broken Hill, Cleland, 5.1917; AD. Dubbo to Minore, Boorman, 10.1908, *55*; Dubbo, Boorman, 8.1903, *56*; Dripstone, Rivers, 1.1923, *57*; near Ivanhoe, Beadle, *24*; near Hillston, Beadle, 8.1940, *46*; Hillston district, Belschner, 19.10.1925, *47*; Hillston, Herriott, 22.10.1936, *48*; Lake Cowal Stn., Marsdens, Wilson, 7.10.1908, *49*; Colando Stn., Leeton, O'Hara, 25.9.1918, *50*; Orlando Stn., Leeton, O'Hara, 11.1918, *51*; Hay, Fletcher, 22.9.1889, *52*; do., G.V.R.S., 3.7.1939, *53*; Yanco, Beadle, *54*; NSW. do., Cleland; AD. Coonong near Narrandera, Cleland "A", 19.9.1918, *58*; NSW. Wagga Wagga, Crouch, 1873; MEL. Zara, Wanganella, Officer 236, 12.1905, *59*; Zara via Hay, Officer 199, 3.1904, *60*; NSW.

Victoria: Mallee, C. French Jnr., 10.1898, *61*; NSW. Wimmera, Swaby, 9.1938; JMB. Wycheproof, per E.F.F., Dec., *1395*; ADW. Moffat Rd., near Wycheproof, Watts 150, 11.12. 1916, *62*; Dimboola, Williamson "A", 1916, *63*; NSW. Richardson's Ck., Woinarski, 11.1883 (*ter*; dup. NSW. *64*); Wimmera; do., "*S. procumbens* var. carina abbreviata *S. oncinotropis* F.v.M."; "Swainsonia Walmar (? Watmar) 18.9.1862, Plains Common" *Scripsit* Dallachy (dup. NSW. *123*); MEL. Lubeck, McLennan, 10.1903, *65*; NSW. Horsham, 1904 (ex Nat. Herb. Vic.); JMB.

South Australia: Diamantina, Morgan, 8.1930 (dup. JMB); Hergott to Strangways Sprs., W.L. Cleland; JBC. Marree, per George, 31.7.1931, *1398*; 2 miles S. of Marree, Andrewartha, 12.2.1937, *2661*; ADW. Boolcoomatta Stn., A. Morris 1447, 22.8.1926, *23*; Between Cockburn and Mingary, A. Morris 641, 14.8.1921, *67*; NSW.

Also, not located: Wallandool, Phillips, 10.1908, *66*; NSW.

37. **S. procumbens** (F. Muell.) F. Muell., Fragm. Phyt. Aust. 3: 46, 1862.

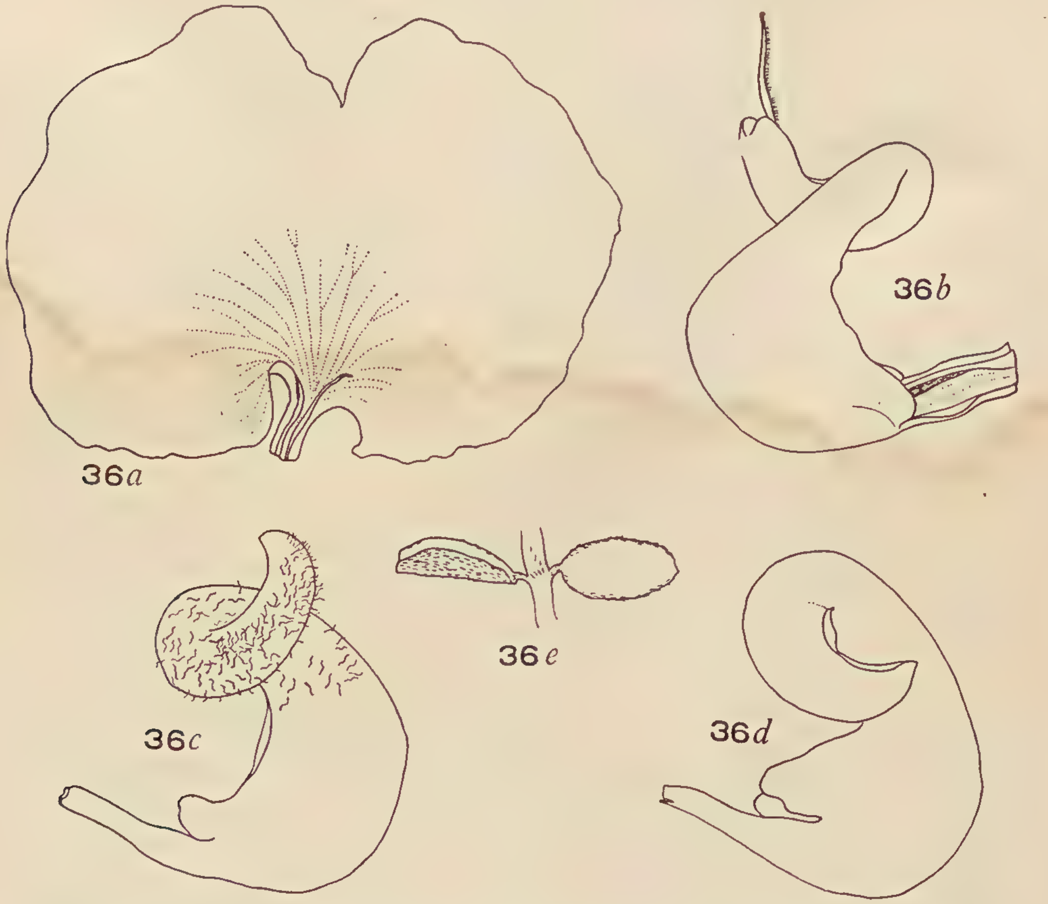
HOLOTYPE, by monotypy: Broughton R., S.A.; MEL.

ABSOLUTE SYNONYM: *Cyclogyne procumbens* F. Muell. Linnaea **25**: 393, 1852.

EQUIVALENT SYNONYMS: *S. violacea* Henderson, Illustrated Bouquet **3**, Plate 69, 1861-4. *Holotype,* by monotypy, not seen: a specimen cultivated by Messrs. E. G. Henderson & Son from seed from the interior of Australia received as *Clianthus* sp.

S. procumbens var. *parvifolia* J. M. Black, Fl. S. Aust.: 319, 1924. *Lectotype*: Bordertown, Turner, 10.10.1911 (very fragmentary); JMB. *Homoeotype*: Bordertown, "Tatiara Pea"; AD.

A very variable plant in size and habit, the stems prostrate or ascending, from about 10 cm. long in small plants to over 30 cm. and rather stout in large plants, clothed with a sparse, or rarely rather dense, pubescence of short, straight, often slightly flattened, closely adpressed white hairs attached basally, or laterally at the base. *Leaves* often about 4 cm. long in the smallest plants to 17 or 18 cm. with



Figs. 36a-e. *S. procumbens* : 36a. standard with deep notch at apex and longitudinal folds in the claw ; 36b, c, d keel (36c. from a flower of the hairy-keeled variant) ; 36e. leaflets (of minimum size). (All x 3.5.)

usually 17-23 leaflets in large, robust ones. *Leaflets* (Fig. 36e) very variable in size and shape, linear to oblong with an obtuse to retuse apex, elliptical or lanceolate, 4 to more than 20 mm. long, pubescence commonly sparse on the lower side and absent above, but sometimes the leaflets almost glabrous, at others rather densely pubescent below and with a few hairs on the upper surface. *Stipules* deltoid to deltoid-acuminate, 2-7 mm. long, often shortly ciliate, leaflike in texture. *Inflorescence* roughly proportional in length to size of the plant, 7-10 cm. long with 4-6 flowers in small specimens, and up to 35 cm. long with 13 flowers in robust specimens, commonly 12-20 cm. long with about 6 flowers usually occupying less than half the length; peduncle sprinkled with a few hairs, or very nearly glabrous. *Flowers* pure blue, mauve or purple, 10-15 mm. long with a very broad standard, the pedicel 3-6 mm. long and more densely pubescent than other parts, about twice the length of the pale, subscarious, sheathing bract. *Calyx* usually 6-7 mm. long, almost or quite glabrous outside, or the teeth shortly ciliate; teeth 3-4 (rarely 2) mm. long, the bracteoles rather broad, 1-2.5 mm. long, usually attached on the pedicel, less commonly on the calyx-base. *Standard* (Fig. 36a) very broadly expanded in many flowers and with a deeper notch than in most species, each half being almost orbicular, the whole 17-26 mm. broad, 12-18 mm. long the claw 2 mm.; calli represented by two very distinct divergent thickened lines the apical part of which sometimes approaches the structure of plate-like calli. *Wings* 10-15 mm. long, obtuse or truncate, the claw 3-4 mm. *Keel* (Fig. 36b-d) twisted into a complete spiral, the apex in pressed specimens recurved on to and often passing the lower part, the tip attenuate and subacute, often yellow on the blue or purple base, 9-12 mm. long, the claw 4 mm., with two very distinct and rather large pouches or folds. *Ovary* closely adpressed-pubescent with white hairs, or rarely glabrous or with hairs only near the base and along the suture, 5-8 mm. on a rather stout gynophore 1-1.5 mm. long at anthesis. *Style* very long inside the keel and very slender except for the slightly flattened base; beard rather dense near the apex extending for about 5-10 mm., the tip minutely inflexed, often extruded from the keel in mature or old flowers. *Fruit* narrow-ellipitical in outline, usually about 20-35 mm. long and 4-7 mm. in diameter, with a beak 2-4 mm. long formed by the style base, the walls firm and rather thick, hoary with scattered, short adpressed hairs, the suture deeply intruded though not always to the base, the gynophore very slightly lengthened.

A variant, in which the keel tip is more or less densely pubescent with short, erect, white hairs, occurs in central and western New South Wales. Specimens showing this variation are marked with an asterisk in the citations below.

DISTRIBUTION: See Map 13, derived from the Type and the following specimens:—

Queensland: near Augathella, MacGillivray 2156, 8.1928; S. Western Queensland, Little, 1910†; BRI.

New South Wales: Comilaroy, Mungindi, Coward, 30.9.1912 (*bis*), *85*; and *84*; NSW. Moree, Cleland, 26.10.1917; AD. Arrara (?Irrara)—Lake Eliza, Boorman, 10.1912, *86*; NSW. Near Wanaaring, Beadle and Brough, 1.9.1939; SYD. Narrabri, Breakwell, 8.1913, *87*; Bourke, Boorman, 9.1912, *88*; do., Maiden, 8.1896, *89*; Bourke district, G.V.R.S., 30.8.1939, *90*; NW Wee Waa, Rupp, 10.1916, *91*; Pilliga, Boorman, 8.1907, *92*; do., Rupp, 26.10.1932, *93*; NSW. do., Rupp, 9.1932; SYD. Castlereagh R.; Liverpool Plains, Moore; MEL. Near Baradine, Witter, 11.1900 (*ter*), *95*; *94*; and *126*; Tamworth, Rupp, 10.1904, *97*; Duri Rd., Tamworth, Rupp, 10.1903, *96*; Coonamble, Breakwell, 8.1912, *99*; do., Breakwell, 11.1912, *98*; do. G.V.R.S., 11.1939, *100*; do., Ryan, 10.1924, *81**; NSW. Darling R., Dallachy & Goodwin (*ter*); MEL. Gulargambone, Cadell, 9.1886, *101*; Nyngan, 10.1936, *79**; Nevertire, A. Morris 1194, 23.9.1924 (dup. BRI), *102*; do., Abrahams, 10.1911, *78**, Warren, te Kloot,

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* Keel pubescent near the apex.

† This is the specimen on which is based Bailey's record of the occurrence in Queensland of *S. canescens* (Qd. Agric. J **25**: 164, 1910).

23.8.1909, *103*; Wilcannia, Pidgeon and Vickery, 20.8.1939, *104*; Scone, Cleland, 24.10.1917, *105*; Condobolin, Innes, 10.1921, *106*; Near Kiacatoo, Beadle, 8.1940, *129*; Euabalong, Boorman, 10.1906, *82*[*]; Lake Cargelligo, Dwyer, 11.1915, *107*; NSW. Hillston, A. Morris 2273, 17.9.1928; BRI. Cowra, Stokes, 10.1920, *108*; Temora, Dwyer, 11.1916, *109*; Temora district, Dwyer, 10.1913, *110*; Ardlethan, Cambage 4228, 1.10.1916, *111*; Hay, Fletcher, 22.9.1888, *112*; do., Cheel, 8.1915, *122*; Hay district, Officer, 9.1903, *113*; Balranald, G.V.R.S., 4.9.1939, *83*[*]; Springbank, Widgiewa Siding, Mackinnon, 7.1912, *114*; Coonong near Narrandera, Cleland "B," 19.9.1918, *115*; Junee, Dwyer, 9.1915, *116*; Wagga, 10.1892, *117*; Zara via Hay, Officer, 3.1904, *118*; Wanganella, via Hay, Officer, 7.1903, *119*; Jerilderie, Dwyer, 10.1920 (*bis*), *77*; and *76*; do., Rochefort, 9.1915, *75*; Deniliquin, *74*; Albury, Bartlett, 9.10.1936, *73*; NSW.

Victoria: "Wimmera, Dallachy" and (second label) "45 Walmar 18 Sept. 1860, Plains, Wimmera"; MEL. Hopetoun, Brymer, 10.1897, *72*; Nhill, Staer, 4.1911, *71*; Dimboola, Williamson 832/16, *70*; Grampians, Walter, 10.1892, *69*; NSW. Benalla, Campbell; Wimmera R., McLennan, 10.1903; BRI. 3 miles E. of Nagambie, H.F.C. Davis, 23.9.1942, *128*; NSW.

South Australia: Lawra (?Laura), Clarke, 21.9.1937, *3817* (*bis*); Without loc., *3136*; ADW. Gladstone, J. M. Black, 10.1908, *127*; NSW. Near Gladstone, "Broughton Pea"; Bordertown, "Tatiara Pea"; AD.

Western Australia: Mt. Barker, A. Muir, 11.1916; PERTH.

ILLUSTRATIONS: Henderson (see above, under Equivalent Synonyms); Fl. Mag. 2 t.106, 1862 (sub *S. violacea*).

38. **S. Drummondii** Benth., Fl. Aust. 2: 220, 1864.

HOLOTYPE by monotypy, not seen: Swan River, W.A., Seed Hort, 1842, Herb. Benthamianum 1854; K, *fide* C. A. Gardner.

The following description is taken largely from Bentham's original with a few additions kindly supplied by C. A. Gardner after an examination of the Type at Kew:

Plants slightly pubescent with basifixed hairs. *Leaves* of 23 leaflets. *Leaflets* narrow-oblong, obtuse, about 25 mm. x 7 mm. *Stipules* broad. *Racemes* loose, with flowers similar in shape to those of *S. procumbens* but much smaller. *Calyx* about 3-4 mm. long, the teeth ciliate inside and about equal to the tube in length. *Standard* 11-12 mm. broad, about 9 mm. long, the claw broad and about 2 mm. long, deeply notched without any calli. *Wings* nearly as long as the standard. *Keel* produced into an obtuse, spirally involute beak. *Style* involute in the keel, the tip itself perhaps inflexed. *Fruit* nearly sessile, oblong-acuminate, about 17 mm. long in an immature state, pubescent, the suture intruded to the base.

In this description, the scanty pubescence, broad stipules, similar flower shape, proportions of calyx teeth and tube, spirally coiled keel, and fruit are all suggestive of *S. procumbens* though the dimensions are smaller, and perhaps also of *S. swainsonioides*. Except for a single specimen of the former species, well outside its apparent range, neither of these is recorded from Western Australia. The absence of thickenings on the standard is in contrast to *S. procumbens*, but corresponds with the condition in some flowers of *S. swainsonioides*.

DISTRIBUTION: See Map 13; known only from the Type specimen.

THE UNIFOLIOLATA GROUP.

S. villosa, S. Incei, S. unifoliolata and *S. cyclocarpa*.

These species are too poorly represented by collections to date to permit much deduction as to their relationships. At present they do not seem to be a very cohesive group except for the pair *S. villosa* and *S. Incei* which, when better known, may prove to be not specifically distinct; all have a strongly tufted style, and this is probably the most significant common feature.

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[*] Keel pubescent near the apex.

They are easily distinguished according to Table XI.

TABLE XI.

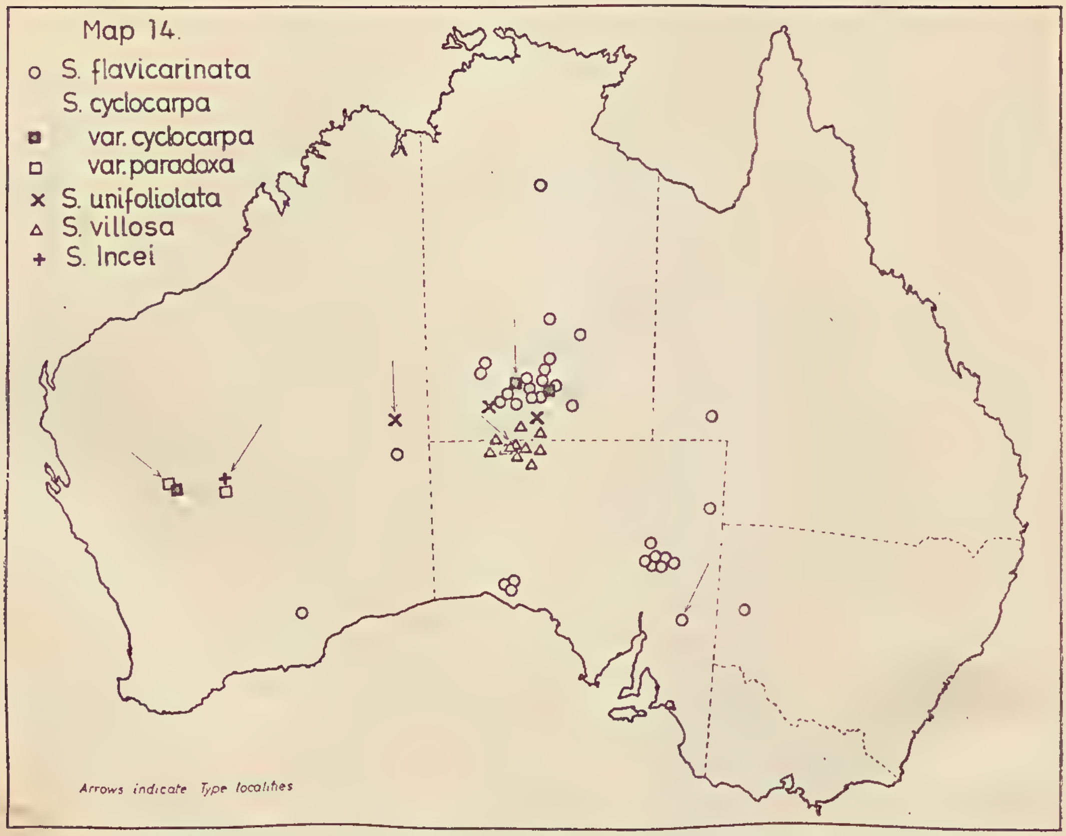
Species.	Leaflets.	Stipules.	Pubescence.	Fruit.
S. villosa	Usually 9–13.	Leafy, the margin few-toothed or undulate 4–10 mm. long.	More or less dense, the hairs rather long and loosely spreading.	Downy with longish hairs; 10–15 mm. x 6–10 mm., smooth.
S. Incei	5–9............	Narrow acuminate 3–4 mm. long.	More or less sparse, the hairs rather long, loosely adpressed to spreading.	Not known.
S. unifoliolata...	1–3 (figs. 38a, b).	Deltoid, acute, 3–5 mm. long.	Hoary with short, closely spaced adpressed hairs.	Hoary, 10–30 mm. x 3–4 mm., more or less smooth.
S. cyclocarpa ...	5–11	Leafy, broad, the margins few-toothed or crenulate 5–7 mm. long.	Very sparse, the hairs short, slightly flattened, adpressed.	Hoary, curved into half-circle or straight, very ornate with ridges and hollows.

39. **S. villosa** J. M. Black, Trans. and Proc. Roy. Soc. S. Aust. 48: 254, 1924.

HOLOTYPE, by monotypy (in poor condition): Glen Ferdinand, Musgrave Ras., S.A., S. A. White, 19.7.1914; JMB.

HOMOEOTYPE: West of Eringa, S.A.; MEL.

Small to rather robust herbs with spreading or ascending stems 5 to over 30 cm. long, clothed with a moderately dense pubescence of long, loosely spreading, silky, basifixed hairs. *Leaves* 3-7 cm. long with 7-15 (usually 9-13) leaflets. *Leaflets* oblong, oblanceolate or narrow-obovate, the apex rounded, truncate or slightly notched, 5-15, often 8-12, mm. x 2-6 mm., pubescent below, glabrous or with a few scattered submarginal hairs above. *Stipules* leafy, with a few irregular teeth or the margin slightly undulate, acute, 4-10 mm. long, sparsely pubescent on both surfaces. *Inflorescence* 15-21 cm. long with about 20 flowers (on a large plant) occupying one-half or more of this length, in smaller plants from 5 cm. long with few flowers; peduncle with a few hairs at first, glabrescent. *Flower* apparently purplish, 10-12 mm. long, on a pedicel 2-3 mm. long pubescent with short dark hairs and subtended by a narrow acuminate bract 3-4 mm. long, slightly exceeding the pedicel. *Calyx* 4-6 mm. long, pubescent with long brown and white hairs, the teeth narrow deltoid to acuminate 2-3 mm. long and about equal to the tube, with a pair of linear or narrow-lanceolate bracteoles 1-1.5 mm. long, at its base. *Standard* broader than long, 11-15 mm. x 10-12 mm. with a short, broad claw 1.5-2 mm. long, and no calli. *Wings* 9-11 mm. long, the apex broadly rounded, the narrow claw 2 mm. long. *Keel* subobtuse, 8-10 mm. long with a claw of 3-3.5 mm.; pouches or folds absent. *Ovary* (Fig. 37a) densely pubescent with long, loosely adpressed hairs; length at anthesis 4-5 mm., the gynophore 1-1.5 mm. *Style* rather stout, bearded chiefly in the upper half, the tip (Fig. 37b) straight, truncate, with a tuft or oblique ring of forward-pointing hairs behind the often-inflexed stigma. *Fruit* oblong-ovoid, 10-15 mm. long, 6-10 mm. in diameter, pubescent with dispersed, long, softly spreading hairs; suture deeply intruded.



DISTRIBUTION: See Map 14, derived from the Types and representative localities among the following specimens:—

Northern Territory: Scrub SE of Goyder's Springs, Tietkins Expedition, 5.8.1889; AD. 60 miles W. of Finke Railway Station, (Cleland), 21.9.1945; do., (Cleland), 22.9.1945; JBC.

South Australia: Musgrave Ras. along N.T. Border, Basedow, 7.1926; Rockhole, 10 miles N. of Ernabella, Cleland, 16.8.1933; JMB. Ernabella, (Cleland), 19.8.1933 (dup. vegetative only, JMB); do., (Cleland), 15.8.1933; do., (Cleland), 25.9.1945; do., (Cleland), 26.9.1945; Ernabella, Musgrave Ras., Brumby, 1937; Between Ernabella and Echo Hill, (Cleland), 20.8.1933 (dup. JMB); JBC. 2 miles W. of Erliwanjawanja, Musgrave Ras., Tindale and Hackett, 21.6.1933; AD. "August 7" (probably Tietkins Expedition, but no data); MEL. Moorilyanna Well, Musgrave Ras., (J. M. Black), 28.7.1914; JMB.

40. **S. Incei** Price, Kew Bull. 1910: 382.

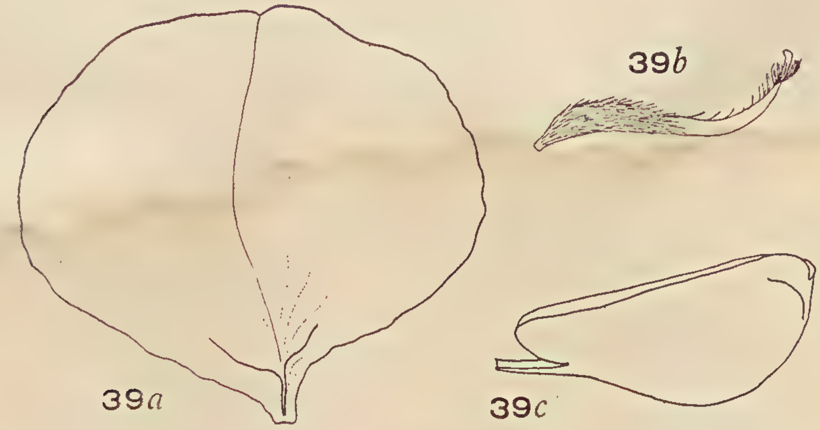
HOLOTYPE, by monotypy, not seen: West Australia, probably Mt. Sir Samuel, W. H. Ince; K.

HOMOEOTYPE, *fide* C. A. Gardner at Kew, 3.12.1937: Mt. Sir Samuel, Gardner 2421, 26.7.1931; PERTH.

An erect or ascending herb, the Homoeotype 30-40 cm. high, the stems softly pubescent, and glabrescent with age; pubescence sparse in Homoeotype, but sometimes denser, of fine, rather long, loosely adpressed or spreading basifixed hairs. *Leaves* 2.5-8 cm. long (Homoeotype 4-8 cm.) with 5-9 leaflets. *Leaflets* from very narrow-elliptical to narrow-obovate, the apex obtuse or retuse with a point, 8-20 (often about 15) mm. long, and 2-8 (often 3-4) mm. broad, glabrous above, pubescent below though very sparsely and chiefly around the margins in the Homoeotype. *Stipules* narrow-deltoid, acuminate, entire, sparsely pubescent or ciliate, 3-7 mm. long. *Racemes* rather dense, 10-20 cm. long with 10 to more than 20 flowers in the upper half or more, the peduncles rather stout. *Flowers* bluish violet according to the original description or red-violet with a white spot on the standard (*fide* Gardner on Homoeotype sheet), 9-11 mm. long on a slender pedicel 2-3 mm. long with spreading hairs in the axil of a narrow, acuminate bract of about equal length. *Calyx* 4 (as in Homoeotype) -5 mm. long, softly pubescent with long, loosely adpressed to more or less spreading, light-coloured hairs, tapering evenly into the pedicel; teeth 1.5-3 mm. long, the bracteoles narrow-linear, attached at the base of the calyx. *Standard* (Fig. 39a) 13-15 mm. long and broad, narrowed evenly into the short (1.5 mm.) claw; calli represented by two slightly thickened lines converging downwards just above the claw. *Wings* 7.5-8.5 mm., the claw 1.5 mm. long. *Keel* (Fig. 39c) broadly obtuse, 8.5-10 mm. long, the claw 2.5 mm. long; pouches absent from the usual position just above the claw but there are usually a pair of pouches or folds just behind the apex of the keel petals. *Ovary* (Fig. 39b) densely adpressed-pubescent with silky, whitish hairs, 4-5 mm. long, on a slender gynophore not more than 1.5 mm. long. *Style* somewhat flattened at the base, rather short, the tip almost straight with a dense, oblique ring of long hairs behind the stigma. *Fruit* unknown.

DISTRIBUTION: See Map 14, derived from the following specimens:—

Western Australia: Mt. Sir Samuel, Gardner 2421, 26.7.1931; PERTH. Specimen without collection data; MEL.



Figs. 39a-c. S. *Incei*: 39a. standard with thickened lines above the claw; 39b. pistil with prominent hairs behind the stigma; 39c. keel with broad folds near the apex. (All x 3.5.)

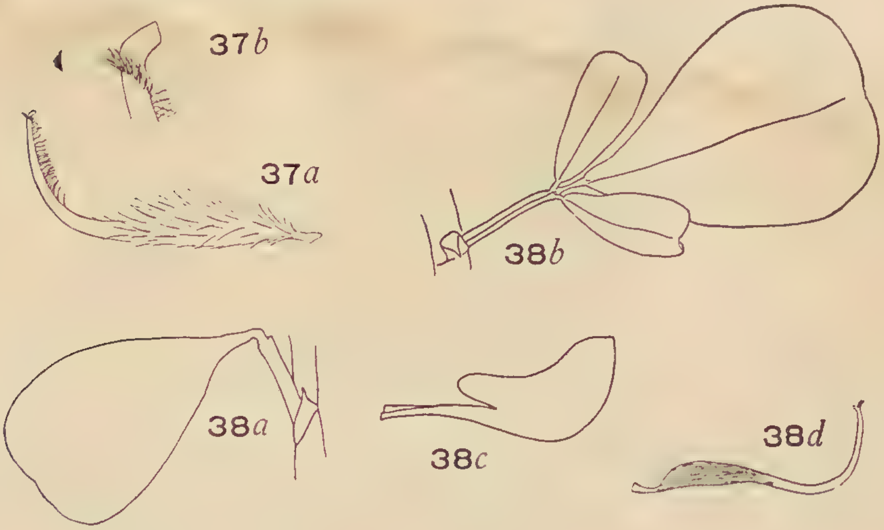
41. **S. unifoliolata** F. Muell., Fragm. Phyt. Aust. 8: 226, 1874.

HOLOTYPE, by monotypy: Between Barrow and Rawlinson's Ranges, W.A., 1874, Giles; MEL.

Erect or ascending herbaceous plants, hoary with an even, close pubescence of short, fine, light-coloured hairs, the stems 15-20 cm. long. *Leaves* (Figs. 38a, b) often about 20 mm. long and 14 mm. broad, unifoliolate or with a pair of lateral leaflets developed below the much larger terminal leaflet (the Type is unifoliolate). *Leaflets* oblanceolate to narrow-obovate, the apex very broad-obtuse and usually notched, when trifoliolate the terminal leaflet about 20 mm. x 10-12 mm., the laterals 8-14 mm. x 5-7 mm., with a rather thick and somewhat foliaceous rachis, pubescent on both surfaces but less densely and glabrescent above. *Stipules* deltoid, acute, 3-5 mm. long, pubescent on both sides. *Racemes* 4-5.5 cm. long with about 8-12 flowers extending almost to the base, the axis softly short-pubescent. *Flowers* purplish, 7-9 mm. long, the subtending bract narrow-deltoid, acute, shorter than the pedicel of 1.5-3 mm. *Calyx* 3.5-5 mm. long, sparsely but evenly adpressed-pubescent with short white hairs, the teeth 1-2 mm. long, the bracteoles almost linear-acute, 0.5 mm. long, attached to the calyx-base. *Standard* 6.5-9 mm. long and broad, narrowed sharply into the 2 mm. claw, without any calli or thickenings. *Wings* 6-8 mm. with a narrow claw 2-3 mm. long. *Keel* (Fig. 38c) 6.5-8 mm. long, the claw 2.5-4 mm., without any pouches or folds, narrow but with an obtuse apex. *Ovary* (Fig. 38d) hoary or densely and closely adpressed-pubescent with short white hairs, about 3 mm. long on a short gynophore up to 1 mm. long. *Style* shortly and sparsely bearded all along, the tip (Fig. 38d) with a short, inflexed (sometimes almost straightened out) segment and a distinct tuft of hairs behind it. *Fruit* oblong-ellipsoid to cylindrical, the wall firm, sparsely pubescent or hoary with short scattered hairs, 10 to nearly 30 mm. long, 3-4 mm. in diameter, with a short unturned beak, a broad, deep suture groove and a stipes elongated slightly to 2 mm. in length.

DISTRIBUTION: See Map 14, derived from the Type and the following specimens:—

Northern Territory: Cameron's Well, C.A., Tate, 1894 (dup. NSW *131*); AD. 29 miles N. of Erldunda Well, Cleland, 3.6.1930; JBC.



Figs. 37a, b. *S. villosa*: 37a. pistil; 37b. style tip with stigma inflexed and oblique ring of hairs behind it. Figs. 38a-d. *S. unifoliolata*: 38a, b. unifoliolate and trifoliolate leaves; 38c. keel; 38d. pistil with tuft behind the stigma. (All x 3.5, except 37b which is x 22, and 38a, b which are freehand drawings x 1.3.)

42. **S. cyclocarpa** F. Muell., Vict. Nat. 8: 136, Jan., 1892.

Holotype, by monotypy: MacDonell Ranges, N.T., Schwarz, 1889; MEL.

Type variety: *S. cyclocarpa* var. *cyclocarpa.*

A polytypic species of two varieties differing chiefly in characters of the fruit.

The species is characterised by a sparse pubescence or hoariness of adpressed hairs laterally atached at the base; leaflets narrow-obovate or obcordate; broad, leafy stipules; violet flowers 8-10 mm. long, the standard with two insignificant calli and the keel obtuse without pouches; a pubescent ovary soon becoming rugulose; a shortly geniculate or inflexed style tip with a tuft or oblique ring of hairs behind the stigma; and especially by the fruit which is semi-circular in outline with a honeycombed pericarp, or roughly elliptical in outline with a very thick wall ornate with strong, undulating ridges.

KEY TO THE VARIETIES.

Fruit (Fig. 40b) curved into a half-circle, the pericarp honeycombed .... α. var. *cyclocarpa.*

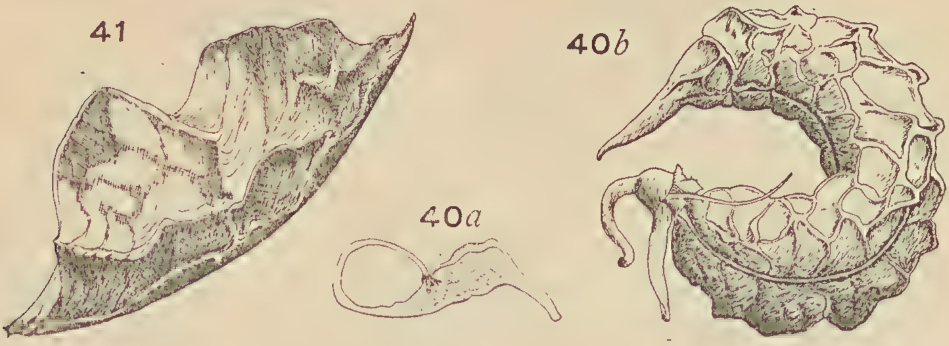
Fruit (Fig. 41) nearly straight, the pericarp deeply and broadly undulate and ridged. β. var. *paradoxa.*

α. var. **cyclocarpa** (F. Muell, sensu orig.) comb. et stat. nov.

Holotype: as for the species.

Absolute Synonym: *S. cyclocarpa* F. Muell. sensu orig.

Prostrate or ascending plants, the stems to over 30 cm. long, with a very sparse pubescence of very short, slightly flattened, adpressed hairs laterally attached at the base. *Leaves* 6-8 cm. long with 5-11 leaflets. *Leaflets* narrow-obovate, truncate, to broadly obcordate with a point in the notch, 8-24 mm. long, often about 12 mm. and up to 15 mm. broad, often 5-10 mm. glabrous above and scantily adpressed-pubescent below. *Stipules* broad, leafly, subacute, 3-7 mm. long and about 5 mm. broad, the margins entire, slightly crenulate or obscurely few-toothed. *Raceme* about 10-20 cm. long with few to about 15 (often about 8) flowers in the upper one-third, the peduncle almost glabrous. *Flower* violet, 8-10 mm. long on a short, slender,



Figs. 40-41. *S. cyclocarpa* : Figs. 40a, b. var. *cyclocarpa* : 40a. pistil, the ovary becoming rugulose, the style with prominent hairs behind the stigma ; 40b. semi-circular pod with honeycombed pericarp. Fig. 41. var. *paradoxa* half pod (divided lengthwise), the pericarp ridged between deep undulations. (All x 3.5.)

finely pubescent pedicel 2-4 mm. long in the axil of a broad, more or less sheathing bract about 1 mm. long. *Calyx* 3-4 mm. long, scantily pubescent with adpressed light and dark hairs, the teeth 1 mm. long, the bracteoles sometimes rather broad, about 1 mm. long, attached at the base of the calyx. *Standard* 8-10 mm. long and broad, tapering gradually into the claw, 3-4 mm. long with 2 small, poorly developed calli above it. *Wings* 8-9 mm. long, 3 mm. broad, the claw 2 mm. the tip broadly rounded. *Keel* obtuse, without pouches or folds, 8-8.5 mm. long, the claw 3 mm. *Ovary* (Fig. 40a) pubescent, with a line of denser white hairs along the suture, about 3 mm. long at anthesis on a very short gynophore (under 1 mm.), becoming rugulose in the young fruit before the keel is shed, the carpophore elongating slightly to about the length of the calyx. *Style* rather sparsely bearded for most of its length, more densely near the apex, the tip (Fig. 40a) with a short geniculate or inflexed segment, and a tuft of hairs behind the stigma. In some flowers part of the geniculate segment seems to have been lost and the style tip appears to be minutely inflexed; in young flowers the tuft is seen as part of an oblique ring of hairs behind the stigma. *Fruit* (Fig. 40b) curved into a complete half-circle, about 15 mm. in diameter, beginning to arch when about 7-8 mm. long; pericarp firm, strongly ridged with irregular reticulations, the apex acute, the suture deeply intruded.

DISTRIBUTION: See Map 14, derived from the Type and the following specimens:—

Northern Territory: Central Australia, Tietkins, 1889; MEL.

Western Australia: Nannine, Gardner 2288, 14.7.1931; PERTH.

β. var. **paradoxa** (W. V. Fitzgerald) stat. nov.

HOLOTYPE, by monotypy: Nannine, W.A., W. V. Fitzgerald, 9.1903, *130*; NSW. (*Haptotype* not seen; K).

ABSOLUTE SYNONYM: *S. paradoxa*, W. F. Fitzg., J. W. Aust. Nat. Hist. Soc. **2**: 5, 1904.

Differs from var. *cyclocarpa* chiefly in the very distinctive fruit (Fig. 41) which is roughly elliptical in outline, 8-15 mm. x 5-6 mm., the wall very thick and hard, with irregular, sharp, undulating, longitudinal ridges in high relief, sparsely pubescent with widely separated adpressed hairs, the suture deeply intruded, completely dividing the loculus into two. Flower parts in the few specimens collected all slightly smaller than in var. *cyclocarpa*. Seeds few but ovules about 16 (6 according to original description but this may have been counted on seeds rather than ovules).

There are so few specimens of these varieties that decisions on status can be tentative only. Differences in form of fruit are not always correlated with other morphological distinctions in the genus, and in the material so far collected this seems to be the only real distinction.

DISTRIBUTION: See Map 14; known only from the Type and the following specimen: Mt. Sir Samuel, W.A., Gardner 2427, 26.7.1931; PERTH.

THE CANESCENS GROUP.

S. flavicarinata, S. Burkei, S. Burkittii and *S. canescens*.

These species form an interesting group with similar details of pubescence and pistil structure suggestive of a common origin. Two of them show intraspecific variation (*S. Burkei* and *S. canescens*) the others being fairly constant in form. *S. flavicarinata* is distinct in its style tip character, having a pendent tuft or ring behind a geniculate or strongly inflexed apical segment, while in the other species there is no tuft and the style tip is hooked or coiled. It is so similar to *S. Burkei*, however, in vegetative and floral characters that there can be no doubt about their affinity. In characters of leaflet- and petal-shape, especially that of the keel, *S. oligophylla* is also similar to *S. Burkei* and to *S. flavicarinata,* and may be more closely related to the CANESCENS group than its position in this paper suggests.

The four species can be distinguished as shown in Table XII.

43. **S. flavicarinata** J. M. Black, Trans. and Proc. Roy. Soc. S. Aust. 48: 254, 1924.

This species was included by Bentham (Fl. Aust. **2**: 218, 1864) in *S. Burkei* by his citation "Newcastle Water, M'Douall Stuart".

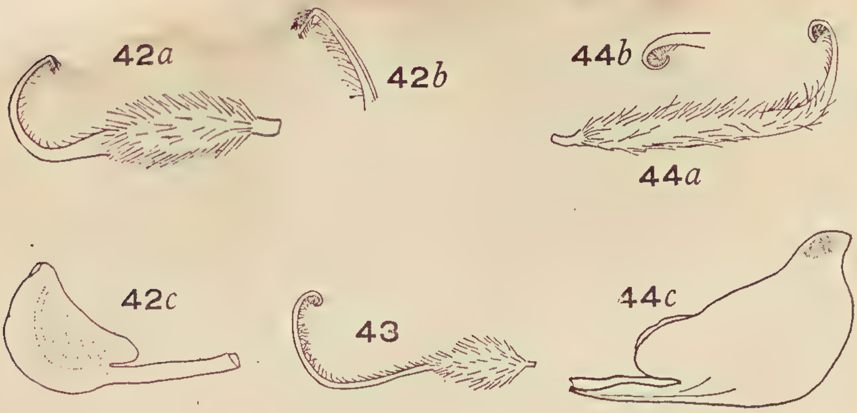
LECTOTYPE: Yunta, S.A., (J. M. Black), 21.10.1917; JMB (*Haptotype,* probably *Isotype,* NSW *134*).

The first of Black's citations with the original description refers apparently to the first two of the Lectoparatypes below. These two specimens are ambiguously labelled and so the specimen implied by his second citation is here designated Lectotype.

LECTOPARATYPES: (1) Yadlacena Soakage, Torrens Plain, S.A., 26.8.1883 (3 labels) and (2) Idyaka, S.A., 2.9.1883 (1 label), all on one sheet bearing 2 specimens; (3) Strzelecki Creek without further data, S.A.; (4) Pidinga, S.A., 1880 (fragment JMB) and perhaps (5) Pidinga, S.A., Ifould, 3.1882; AD. (6) Kars Stn., 40 miles NE of Broken Hill, N.S.W., Ising, 16.10.1921; JMB. (7) Mt. Squires, Barrow Ra., W.A., Helms, 23.8.1891 (Fragment JMB); (8) Fraser Ra., W.A., Helms, 4.10.1891; AD.

Except for slight differences in density of pubescence, the Lectoparatypes are all identical with the Lectotype.

A prostrate or ascending plant with several stems often over 30 cm. long, clothed with rather long and coarse, white, subbasifixed hairs, spreading or loosely adpressed.



Figs. 42a-c. *S. flavicarinata* : 42a. pistil ; 42b. geniculate style tip with pendent tuft behind the stigma ; 42c. keel with long claw. Fig. 43. *S. Burkittii* ; pistil with incurved style tip. Figs. 44a-c. *S. canescens* var. *canescens* : 44a. pistil ; 44b. style tip, incurved ; 44c. keel with apical calli. (All x 3.5 except 42b. which is x 7.)

TABLE XII.

Species.	Style Tip.	Pubescence.	Keel.	Leaflets.	Flowers in Raceme.	Fruit.
S. flavicarinata ...	Geniculate with a pendent tuft or ring behind the stigma (Figs. 42a, b).	Hairs rather long and loosely spreading.	Yellow (Fig. 42c).	5–9, glabrous above ...	Usually about 11.........	*ca.* 10 mm. x 5 mm.
S. Burkei	Hooked to coiled, without any tuft (Fig. 45c).	Hairs rather long and loosely spreading.	Purplish (Figs. 45d, 46c).	7–11, glabrous above	4–8, rarely –15, crowded near the apex.	10–20 mm. x 4–5 mm.
S. Burkittii	Hooked to coiled, without any tuft (Fig. 43)	Of short, dense, erect hairs.	Purplish	Numerous, up to 31, tomentose on both sides, at least at first.	Up to about 50, crowded in a long raceme.	More or less rotund, 7–8 mm. x 5 mm.
S. canescens	Hooked to coiled, without any tuft (Figs. 44a, b.)	Of short, dense, erect hairs.	Purplish (Fig. 44c).	Usually 11–13, the upper side glabrous or pubescent.	Usually *ca.* 25 in a crowded raceme.	10–15 mm. x 4 mm.

Leaves 1.5-5, often 2-4, cm. long with 5-9 leaflets. *Leaflets* narrow-obovate to obovate, the tip often with a small point but rarely notched, 7-20 (usually 10-15) mm. long, 3-10 (usually 5-8) mm. wide, glabrous above, softly pubescent underneath. *Stipules* leaf-like, narrow-deltoid, acuminate, 4-7 mm. long, sparsely pubescent on both sides. *Raceme* 5-13 cm. long with 5-15 (usually about 11) flowers in the upper one-third or one-half, the peduncle with spreading hairs. *Flowers* with the wings and standard bluish or purplish and the keel yellow, 8-10 mm. long, the pedicel white-hairy, 2-3 mm. long usually a little shorter than the subulate bract with spreading hairs. (In dried specimens which have lost the purplish flower colour, the keel appears lighter in colour than the other petals). *Calyx* 5-8 (usually 7) mm. long, the tube 2-3 mm. always shorter than the subulate teeth, pubescent with rather long white hairs, chiefly on the veins and on the tooth-margins, with a pair of linear bracteoles usually about 2 mm. long, at the base. *Standard* 8-11 (usually 9-10) mm. long and broad, the claw short and rather broad, 1-2 mm. long, and usually with two slightly thickened longitudinal ridges ceasing or diverging shortly in the lamina. *Wings* 5-7.5 (usually 6) mm. long with a short bent claw only 1-1.5 mm. long. *Keel* obtuse (Fig. 42c), often with a slight tendency to twist sideways, 7-9 mm. long, the claw long and narrow (4-4.5 mm.) without pouches or folds, very uniform in shape throughout the species. *Ovary* (Fig. 42a) densely pubescent with white or tawny adpressed hairs, about 3 mm. long at anthesis on a very short gynophore only 0.5 mm. long. *Style* flattened near the base, finely bearded all along, the tip (Fig. 42b) shortly geniculate with a tuft of hairs falling along the inflexed section. *Fruit* rounded-oblong in outline, about 10 mm. long, 5 mm. in diameter, softly pubescent with spreading white hairs, the wall firm, the suture intruded to the base. "Fattening fodder" *fide* Max Koch 312A.

Very similar in appearance to *S. Burkei* though usually less hairy in old plants, but easily distinguished by its different style tip, its yellow keel, the distribution of hairs on the calyx, shape of keel, flattened style, subbasifixed hairs and often shorter, stouter fruit.

DISTRIBUTION: See Map 14, derived from the Types and the following specimens:—

Northern Territory: Central Australia; Newcastle Waters, J. Macd. Stuart; Barrows Ck., Chandler, 1880; MEL. Macdonald Downs, Fraser R., (Cleland), 28.8.1930; Mt. Liebig, (Cleland), 14.8.1932 (dup. JMB); Burt's Well, (Cleland), 24.8.1931; JBC. Derwent Ck. Camp, Horn Expedition; AD. Near Alice Springs, C. Giles, 5.1875 (dup. NSW *137*); S. side of Macdonnell's Ra., E. Giles; MEL. Connor's Well, (Cleland), 23.8.1931; JBC. James Ra., H. Kempe, 1885; MEL. Ooraminna, ?Horn Expedition; Palm Ck., ?Horn Exp.; AD. Camp 12 miles SW of Henbury, (Cleland), 4.6.1935; Near Henbury Craters, (Cleland), 19.6.1935; JBC. E. end of Gill's Ra.; AD. Finke R., H. Kempe, 1879; MEL. Central Australia, Tate, 1894, *136*; NSW.

Queensland: Diamantina R., Morgan, 8.1930; JBC.

New South Wales: Broken Hill, Johnston, 1939 or 1940; JMB. Kars Stn., between Menindie and Broken Hill, A. Morris 746, 16.10.1921, *135*; NSW.

South Australia: 66.2 miles from Farina (near Murnpeowie, E. of Marree), Andrewartha, 14.2.1937, *2659*; ADW. Mt. Lyndhurst, Koch 312C, 10.1899; do., Koch 312D, 8.1898; AD. do., Koch 312A, 10.1898, *132*; do., Koch 312B, 8.1899, *133*; NSW. Pidinga, Tietkins; MEL.

44. **S. Burkei** F. Muell. ex Benth., Fl. Aust. 2: 218, 1864, in part.

This name is used in the restricted sense, excluding specimens agreeing with the second citation of Bentham which was subsequently distinguished as *S. flavicarinata* J. M. Black.

LECTOTYPE: Burke's Ck. N.T., J. McDouall Stuart, 1862; MEL (fragmentary *Faptotype* NSW *139*).

TYPE SUBSPECIES: *S. Burkei* ssp. *Burkei*.

A polytypic species of two geographic races, differing in the shape of the keel and wings and in the thickenings on the standard.

The plants are small and ascending, rather densely pubescent with soft, basifixed hairs. Flowers are purple, the calyx with long, acute teeth and long bracteoles, the style with a hooked or almost coiled tip, the ovary and fruit villous; keel obtuse or acute, standard with a pair of small punctate calli or with two upwardly divergent thickened lines above the claw or unthickened.

KEY TO THE SUBSPECIES.

Keel obtuse or with an obtuse, thickened or fanned-out tip (Fig. 45d); wings more or less triangular (Fig. 45b); standard with small calli on the claw (Fig. 45a) .... a. ssp. *Burkei.*

Keel acute (Fig. 46c); wings not triangular (Fig. 46b); standard with upwardly diverging thickened lines in the claw (Fig. 46a) .... b. ssp. *acuticarinata.*

a. ssp. **Burkei** (F. Muell. ex Benth. quoad Lectotypum) comb. et. stat. nov.

Lectotype: As for the species.

Absolute Synonym: *S. Burkei* F. Muell. ex Benth. quoad Lectotypum.

A small ascending plant, the stems usually about 15-30 cm. long, with a rather dense pubescence of pale or white, long, loosely adpressed or spreading, basifixed hairs on the stems, young inflorescences and underside of the leaflets. *Leaves* of 7-11 leaflets, the upper side glabrous or with a few hairs chiefly around the margin. *Leaflets* obovate, often with a minute point, 8-20 mm. x 3-12 mm. *Stipules* variable, from narrow-deltoid, subulate, 5 mm. long and 1.5 mm. across the base, to scarcely pointed, very broad, leafy, 8 mm. broad and 10 mm. long. *Inflorescence* usually a short raceme or even umbellate with the flowers rather crowded near the apex, 3.5-11 cm. long with 4-8 (rarely as many as 15) flowers in the upper one-half or less. *Flowers* purple, 7-9 mm. long,. on a 1.5-3 mm. pedicel which is shortly exceeded by the narrow-lanceolate subtending bract 2-4 mm. long. *Calyx* rather sparsely pubescent when mature and then chiefly along the ribs and inside the teeth, 5.5-8 mm. (Lectotype 8 mm.) long, the teeth usually long-acuminate, 3.5-6 mm. (Lectotype 6 mm.), with linear bracteoles 1.5-4 mm. (Lectotype 4 mm.) long, often more or less hidden in the pubescence. *Standard* (Fig. 45a) about 10-11 mm. long and broad, usually slightly broader than long, narrowed abruptly into the linear 1.5-2 mm. claw on which, near the middle or top, are two small punctate calli. *Wings* (Fig. 45b) 5-8 mm. (Lectotype 8 mm.) long, roughly triangular in outline, the 1-1.5 mm. claw as broad as long. *Keel* (Fig. 45d) 7-9 mm. (Lectotype 9 mm.) long, the claw 3-3.5 mm., the apex thickened and slightly fanned-out; pouches absent or represented only by slight indentations of the petals. *Ovary* (Fig. 45c) densely and loosely adpressed-villous with white and creamy hairs 2-3 mm. long at anthesis on a short gynophore of 0.5-0.75 mm. *Style* bearded all along but most densely inside the hooked or almost coiled tip (Fig. 45c). Fruit about 1-2 cm. long, oblong in outline, 4-5 mm. in diameter, sparsely villous with a deeply intruded suture.

Distribution: See Map 15, derived from the Type and the following specimens:

Northern Territory: 38 miles NW Camp IV, Lander Ck., Hill 378, 24.6.1911; MEL. Atatanga, Strehlow, 1922-3; AD. Mission Stn., Finke R., Kempe, 1879; Finke R. S.A., H. Kempe 139, 1879; do., H. Kempe, 1889; MEL. Hermannsburg, (Cleland), 20.8.1929; 25 miles W. of Erldunda, (Cleland), 2.6.1935; JBC.

Queensland: Cloncurry, per Goddard; Dajarra-Urandangie Road, MacGillivray 2155, 22.7.1928; Willgunya, Winton, Cameron 38, 10.1924; BRI.

b. ssp. **acuticarinata** ssp. nov.

Holotype: Camp 10 S.A., Helms, 27.6.1891, *140*; NSW (*Haptotype* AD).

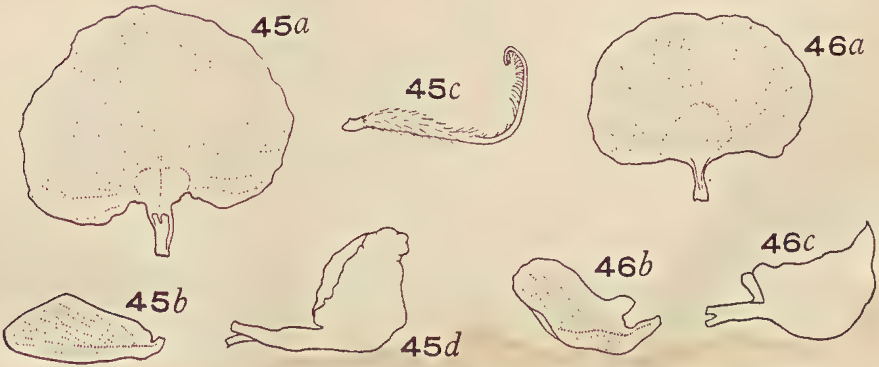
Differs from ssp. *Burkei* in the following characters: *Standard* (Fig. 46a) with two upwardly divergent thickened lines above the claw, instead of punctate calli, or sometimes without any thickenings; *wings* (Fig. 46b) with broadly rounded tips not angular in outline; *keel* (Fig. 46c) with an acute, almost rostellate tip, in pressed specimens sometimes turned sideways; *style* sometimes with a finer, more closely hooked tip.

Ab ssp. *Burkei* in vexillo lineis divergentibus duabus super unguem non callis punctatis; in alis non angularibus sed apice lato-rotundatis, et in carinae apice acuta, subrostellata, differt.

Distribution: See Map 15, derived from the Type and the following specimens:—

Northern Territory: Mt. Sonder, MacDonnell Ras., Davenport; AD. Middleton's Ponds to Liddle's, (Cleland), 7.6.1935; Rodinga, Pink 141 & 150, 20.9.1930; JBC.

South Australia: Mt. Goolwa, E.E.E. Camp 6, Helms, 19.6.1891 (dup. MEL); AD. Barton, next station E. of Ooldea, (J. M. Black), 22.9.1920; JMB.



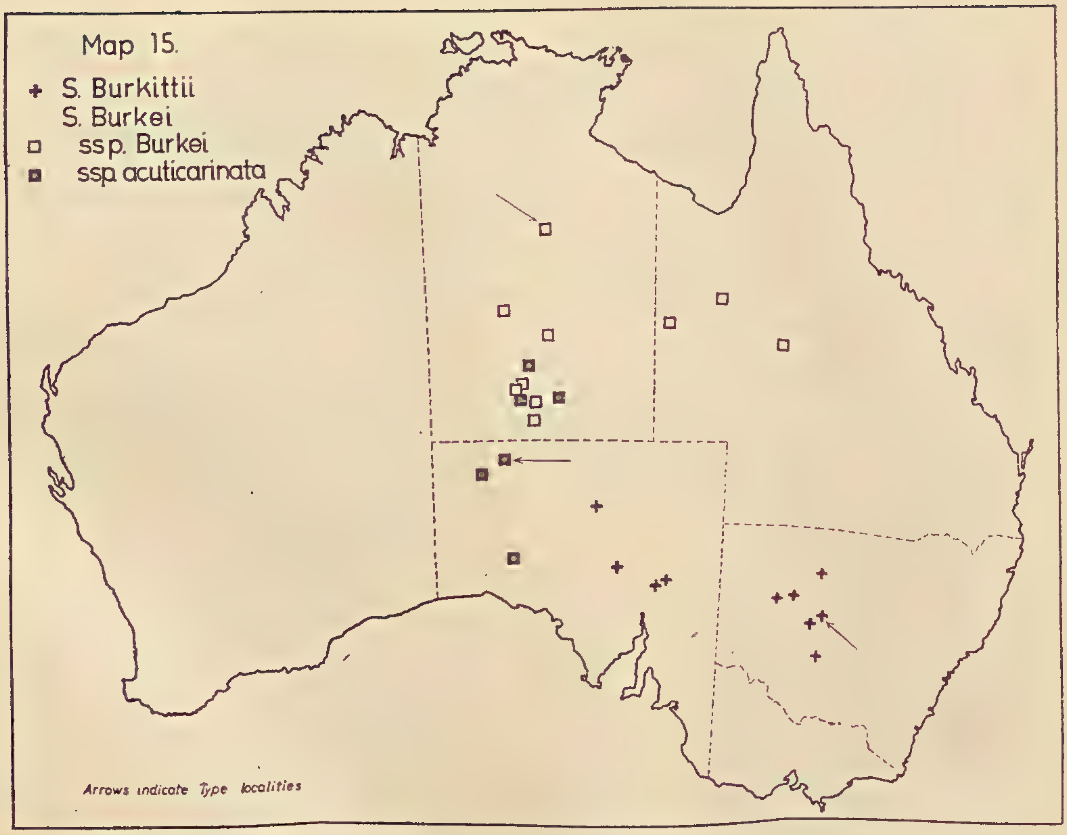
Figs. 45-46. *S. Burkei*: Figs. 45a-d. ssp. *Burkei*: 45a. standard with small calli on the claw; 45b. triangular wing; 45c. pistil, the style tip incurved to coiled; 45d. keel with fanned-out apex. Figs. 46a-c. ssp. *acuticarinata* 46a. standard with thickened lines in the claw; 46b. wing, not triangular; 46c. acute keel. (All x 3.5.)

45. **S. Burkittii** F. Muell. ex Benth., Fl. Aust. 2: 218, 1864.

Lectotype: Between Lachlan and Darling Rivers, N.S.W., Burkitt; MEL. (*Haptotype* NSW *144*).

Lectoparatype: Scrub NE of Lake Gairdner, S.A. (Herb. Mueller); MEL.

A small suberect shrubby plant with stems sometimes exceeding 40 cm. in length, densely tomentose with white or creamy, spreading, more or less woolly hairs. *Leaves* 7-15 cm. long with numerous leaflets (to 31). *Leaflets* oblong, obovate, broad-obovate or rotund, the apex rounded or shortly notched, 4-16 mm. x 3-9 mm. but commonly 5-10 mm. x 4-6 mm. densely tomentose on both sides when young, glabrescent above. *Stipules* deltoid, 2-4 mm. long, tomentose. *Raceme* up to 26 cm. long with numerous flowers (nearly 50 in a long, crowded raceme) occupying about three-fourths of this length. *Flower* red, purplish or blue according to collector's notes, 8-9 mm. long. on a short pedicel of about 2 mm. usually a little shorter than the



subtending bract. *Calyx* 5-7 mm. long, the teeth 3-4 mm., all densely tomentose; bracteoles linear, 1.5-2 mm., often attached on the pedicel. *Standard* 8-11 mm. long and broad, the claw 1-2 mm. with two more or less distinct, short, thickened ridges above it, often converging to form an inverted V. *Wings* rather narrow 6-8 mm. x 1.5 mm. the claw 1.5-2 mm. long. *Keel* subacute to obtuse, 7-9 mm. long, the claw 3 mm., without any pouches or folds. *Ovary* (Fig. 43) densely villous-tomentose, 2-3 mm. long on a slender gynophore up to 1 mm. long at anthesis. *Style* bearded all along, the hairs near the base long like those on the ovary, shorter, finer and dense near the coiled, hooked or strongly incurved tip (Fig. 43). *Fruit* more or less rotund, densely tomentose, 7-8 mm. long, 5 mm. in diameter, the suture deeply intruded with 1 reniform seed (?2 or 3 ovules) in each of the loculi so formed.

DISTRIBUTION: See Map 15, derived from the Types and the following specimens:—

New South Wales: Louth, Darling R., Abrahams, 10.1910, *141*; Bulla Bulla, A. Morris 2245, 6.10.1928 (dup. BRI), *142*; Wilcannia, per G.V.R.S., 10.1934, *143*; NSW. Between Lachlan and Darling Rs., Day, 10.1878; Murrumbidgee, Bennett, 1886; MEL.

South Australia: Northern S.A., Richardson, 7.1937, *2738*; ADW. Nilpena, (J. M. Black), 8.1921; JMB. 8 miles W. of Parachilna, (Cleland), 19.8.1921 (dup. JMB); JBC.

46. **S. canescens** (Benth. apud Lindl.) F. Muell., Fragm. Phyt. Aust. 3: 46, 1862.

TYPE: No specimens were cited with the original description, but collections by J. Drummond, J. and R. Mangles, Mr. Toward and N. B. Ward comprised the material from which Lindley's "Sketch of the Vegetation of the Swan R. Colony" (Edwards' Bot. Regist., Appendix: 16, 1839) was compiled. If an appropriate specimen from one of these collectors is extant in Bentham's Herbarium, it must be recognised as the Type. Because it agrees closely with the description, and because of the possibility that it duplicates the material on which Bentham based his species, the following specimen has been used tentatively to typify the species:

"S. canescens F. v. M., W.A., J. Dr. 268"; MEL.

TYPE VARIETY: *S. canescens* var. *canescens.*

A polytypic species of two varieties differing only slightly in the pubescence of ovary and leaflets. The plants are rather large shrub-like herbs, densely tomentose with soft, basifixed hairs; flowers purplish, the keel with a pair of calli near the tips of the petals, the style coiled at the apex, the leaflets pubescent on the under side or on both sides and the ovary densely silky with adpressed or spreading hairs.

ILLUSTRATION: Paxton's Mag. **7**: 199, 1840 (sub *Cyclogyne canescens*; the variety is not clear from this plate).

KEY TO THE VARIETIES.

Leaflets densely tomentose on both sides, the upper surface sometimes a little less densely; ovary densely silky with spreading hairs .... α. var. *canescens.*

Leaflets glabrous above, or rarely with a few hairs near the base of the upper surface; ovary adpressed-silky .... β. var. *Horniana.*

α. var. **canescens** (Benth. apud Lindl. quoad Typum) comb. et stat. nov.

TYPE: as for species when designated.

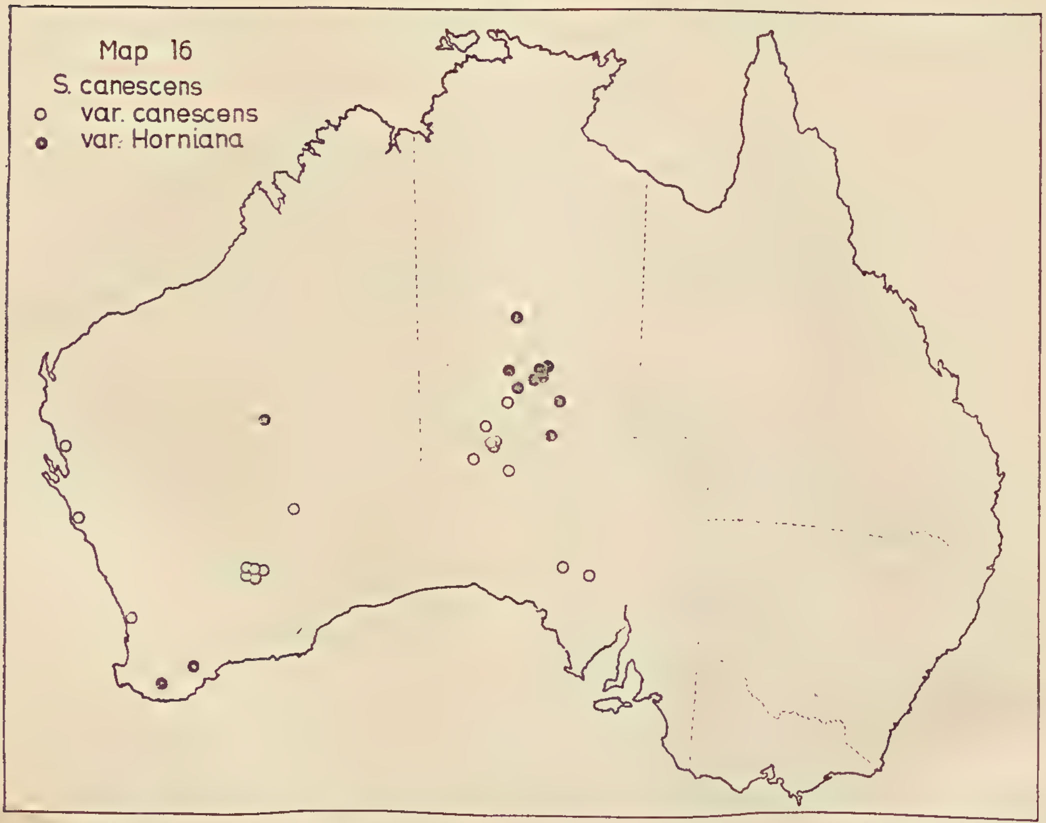
ABSOLUTE SYNONYMS: *Cyclogyne canescens* Benth. apud. Lindl. quoad Typum, Edwards' Bot. Regist., Appendix: 16, species No. 72, 1839.

Swainsona canescens (Benth. apud Lindl. quoad Typum) F. Muell.

A rather large, stout-stemmed, ascending or suberect herb, the stems 20 cm. or more long, clothed, like the leaves, with a dense tomentum of rather long, fine, basifixed, white- or cream-coloured, spreading hairs. *Leaves* 5-11 cm. long with 9-15 leaflets (usually 11-13). *Leaflets* densely tomentose, sometimes more sparsely on the upper surface as in the original description, 12-30 mm. long, 5-15 mm. broad (often 8-12 mm.), obovate or broad-elliptical to oblong, sometimes with a very shallow notch and a small point. *Stipules* roughly deltoid, up to 10 mm. long and 8 mm. across the base, tomentose like the stems. *Racemes* 9-20 cm. long with numerous crowded flowers, usually about 25 (20-35), in the upper one- or two-thirds. *Flowers* purple with green markings on the standard (a note on one sheet states that the flowers are pale yellow, but this seems to be their colour when dry), 8-9 mm. long on a very short pedicel subtended by a narrow, acute bract 3-4 mm. long. *Calyx* 4-6 mm. long, the teeth 2-4 (usually 2-3) mm. broadly deltoid, acute or acuminate, equal to or longer than the tube; bracteoles linear, 1-3.5 mm. long. *Standard* about 11-12 mm. long and broad, with a short and rather broad claw 1-2.5 mm. long, ecallose, or rarely with a pair of slightly thickened divergent ridges near the top of the claw. *Wings* obtuse, 8-9 mm. long, the claw narrow, 1.5-2 mm. *Keel* (Fig. 44c) subacute, the petals each with a small, thickened tip, 9-11 mm. long, the claw 3-4 mm., without any pouches or folds. *Ovary* (Fig. 44a) densely silky with more or less spreading hairs, about 4 mm. long at anthesis, on a 1 mm. gynophore. Style with a dense beard throughout but longer at the base and inside the coiled tip (in old flowers sometimes relaxed to a hooked or incurved condition; Fig. 44b). *Fruit* oblong 10-15 mm. long and 4 mm. in diameter in the few specimens seen, the suture intruded, the wall still rather densely tomentose.

DISTRIBUTION: See Map 16, derived from the following specimens:—

Northern Territory: Angus Downs, (Cleland), 6.6.1935; about 150 miles W. of Finke Railway Station, (Cleland), 23.9.1945; JBC.



South Australia: Ernabella, Musgrave Ras., Young, 7.1944 (dup. NSW *820*); MEL. Ernabella, Musgrave Ras., Brumby, 1937; do., Rocky Hill, (Cleland), 24.9.1945; JBC. Glen Ferdinand, Musgrave Ra., S. A. White, 19.7.1914; Sandy Flat near Pundi (S. of Musgrave Ras.), Finlayson, 1.1934; Wilgena (Tarcoola), Mellor, 6.1912; JMB. Bitter Well, Coondambo, (Cleland), 29.10.1929 (dup. JMB); JBC.

Western Australia: Shark Bay, Mueller, 10.1877; MEL. Northampton, 10.1898, Helms (*bis*), *158*; and *159*; NSW. E. of Laverton, Clarke, 7.1916; near Kalgoorlie, Gardner 791, 23.9.1920; PERTH. Paddington, ex herb. W. V. Fitzgerald, 9.1898, *149*; NSW. Kalgoorlie, du Boulay, 11.1910; MEL. Coolgardie, C. L. Webster, 1898, *150*; do., L. G. Webster, 1899, *151*; do., L. C. Webster, 1900, *152*; do., Helms 8, 10.1899, *155*; do., Helms per Natham, 10.1899 (*bis*) *153*; and *154*; Kurrawang, 11.1903, ex herb. W. V. Fitzgerald, *156*; Perth, per Woods and Forests Dept., 9.1900, *157* (locality doubtful); NSW. Interior of SW. Australia, Cronin, 1894; MEL.

β. var. **Horniana** J. M. Black, Flora S. Aust.: 318, 1924.

HOLOTYPE (only the specimen so labelled since others on the sheet are from different or ambiguous localities): Central Australia, Tate, 1894, sub *S. Horniana*; AD (*Haptotype* NSW *148*). The identity of this specimen as Holotype is inferred from Black's citation "*S. Horniana* Tate Hb."

ABSOLUTE SYNONYM: *S. Horniana* Tate ex J. M. Black in syn.

Differs from var. *canescens* in the less dense tomentum, the upper side of the leaflets quite glabrous, or very rarely with a few hairs near the base, and in the less densely pubescent ovary with fine, *adpressed*, silky hairs. The leaflets are often narrower than in var. *canescens*, 5.5-8 mm. wide in many specimens, but sometimes of similar proportions to those of that variety.

DISTRIBUTION: See Map 16, derived from the following specimens:—

Northern Territory: Near Coniston Stn., E. C. Black, 8.1936; JMB. Alice Springs, Tate, 1894 (dup. NSW *147*); AD. do., Allen, 8.1922, *146*; NSW. do., (Cleland), 27.5.1935; do., (Cleland), 24.8.1936; JBC. Glen Helen Gorge, Tate, 6.1894; AD. MacDonnell's Ra., Giles; MEL.

? South Australia: Central Australia, per C'wealth Dept. of Works, 10.1929; JMB.

Western Australia: Parker's Ra.; Towards the Tone R., Muir, 1880; From Salt R., MEL.

THE LUTEOLA GROUP.

S. Oliveri and *S. luteola*.

In spite of apparent similarity to *S. rostellata* and some forms of *S. microphylla*, the real affinities of *S. Oliveri* are with *S. luteola*. The two are extraordinarily similar in pistil structure and especially in their rather unusual petal shapes, but there is a marked size difference between them in these structures as well as some difference in the vegetative characters, e.g. leaflet size and shape are not similar. As with the species of the CAMPLYANTHA group, these two occupy adjacent areas which do not overlap, and constitute an *Artenkreis* of two completely discrete species.

Their chief distinguishing features are shown in Table XIII.

TABLE XIII.

Species.	Flower.	Wings.	Raceme.	Leaflets.
S. Oliveri ...	4–5 mm. long	3–3·5 mm. long	Aristate, of 1–3 flowers, usually longer than the leaves.	2–6·5 mm. x 1–2 mm.
S. luteola	6–8 mm. long	4–5·5 mm. long	Shorter than the leaves with 5–15 flowers.	7–13 mm. x 3–10 mm.

47. **S. Oliveri** F. Muell., Sth. Sci. Rec. 2: 152, 1882.

The epithet *Oliveri* is not strictly in accordance with Art. 70 of the International Rules, since Mueller published the spelling *Oliverii* and confirmed his intention by writing this epithet on a number of labels in the National Herbarium at Melbourne. However, the epithet *Oliveri*, which is the orthographic form in accordance with Rec. XL (b), is adopted here in anticipation of the acceptance of M. L. Green's proposal (1939) awaiting decision at the next International Congress.

HOLOTYPE, by monotypy: Near Port Eucla, W.A., John Oliver, 2.6.1882; MEL (*Haptotypes* AD; NSW *160*).

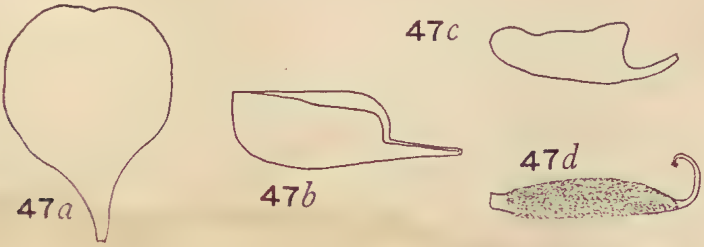
Small prostrate herbs, with stems up to about 15 cm. long radiating from a central tap root, rather sparsely pubescent with short, adpressed hairs basifixed or laterally attached at the base. *Leaves* 1.5-3.5 cm. long, with 9-13 (usually 11) leaflets. *Leaflets* narrow-obovate, the apex obtuse or retuse, 2-6.5 (usually 3-4) mm. x 1-2 mm. glabrous above, pubescent underneath. *Stipules* narrow-deltoid, 1-2 mm. long, pubescent outside. *Raceme* 1-4 cm. long, the peduncle very slender, aristate, with a few hairs, and 1-3 very small flowers near the apex. *Flower* colour said to be blue in the original description, but yellow (*fide* A. Morris 662), or with a yellow standard and keel white with pink tips (*fide* J. M. Black, Trans. and Proc. Roy. Soc. S. Aust. **37**: 121, 1913), drying pale yellow (A. Morris 662) or pale with a deep bluish-purple tip to the keel (Holotype); flower 4-5 mm. long on a dark-haired pedicel 1-2 mm. long in the axil of a minute bract of about 1 mm. *Calyx* 2.5-3 mm. long, pubescent with dark hairs, the teeth deltoid, 1 mm. long, the bracteoles minute. *Standard* (Fig. 47a) longer than broad, 3.5-4 mm. x 2.5-3 mm., without calli, tapering gradually into the short claw only 0.5-1 mm. long. *Wings* (Fig. 47c) only 3-3.5 mm. long, narrow, the claw 1 mm. long. *Keel* (Fig. 47b) narrow, obtuse, 3.5-4 mm. long with a claw of 1.5 mm., without any pouches or folds. *Ovary* (Fig. 47d) densely adpressed-pubescent with white hairs, 2-3 mm. long on a very short gynophore less than 0.5 mm. long. *Style* very short, the beard not certainly present, the tip (Fig. 47d) incurved or almost coiled with a tuft of short hairs behind the stigma. *Fruit* cylindrical, shortly pointed at both ends, 15-25 mm. long, 2-4 mm. in diameter, the walls thin but firm, smooth, hoary with short adpressed hairs, the suture deeply intruded.

DISTRIBUTION: See Map 17, derived from the Type and the following specimens:—

New South Wales: Tarella, Bauerlen 22, 8.1887; MEL. Broken Hill, Chadwick, 23.9.1942, *161*; Crossing's Paddock, Broken Hill district, A. Morris 662, 28.8.1921 (dup. JMB; BRI), *163*; NSW.

South Australia: Ooldea, Ising, 16.9.1920; JMB. Tarcoola, Mellor 6, 6.1912; MEL. Wilgena (Tarcoola), Mellor, 6.1912 (dup. NSW. *162*); JMB.

Western Australia: 100 miles N. of Eucla, Batt, 1889; half-way between Mt. Ragged and (Queen) Victoria Springs, Brooke, 1886; MEL.



Figs. 47a-d. *S. Oliveri* : 47a. standard ; 47b. keel 47c. wing ; 47d. pistil with hairs behind the coiled style tip. (All x 7.)

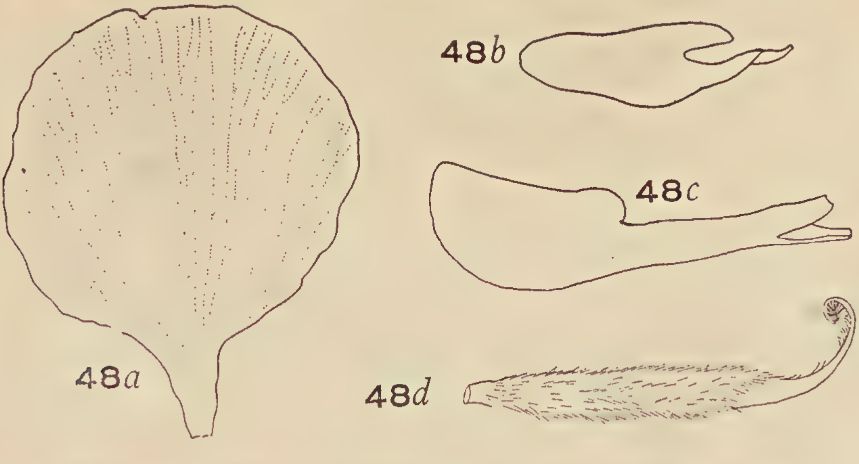
48. **S. luteola** F. Muell., Fragm. Phyt. Aust., 1: 75, 1859.

HOLOTYPE, by monotypy and HAPTOTYPE on same sheet: Peak Downs, Qd., Ferd. Mueller; MEL.

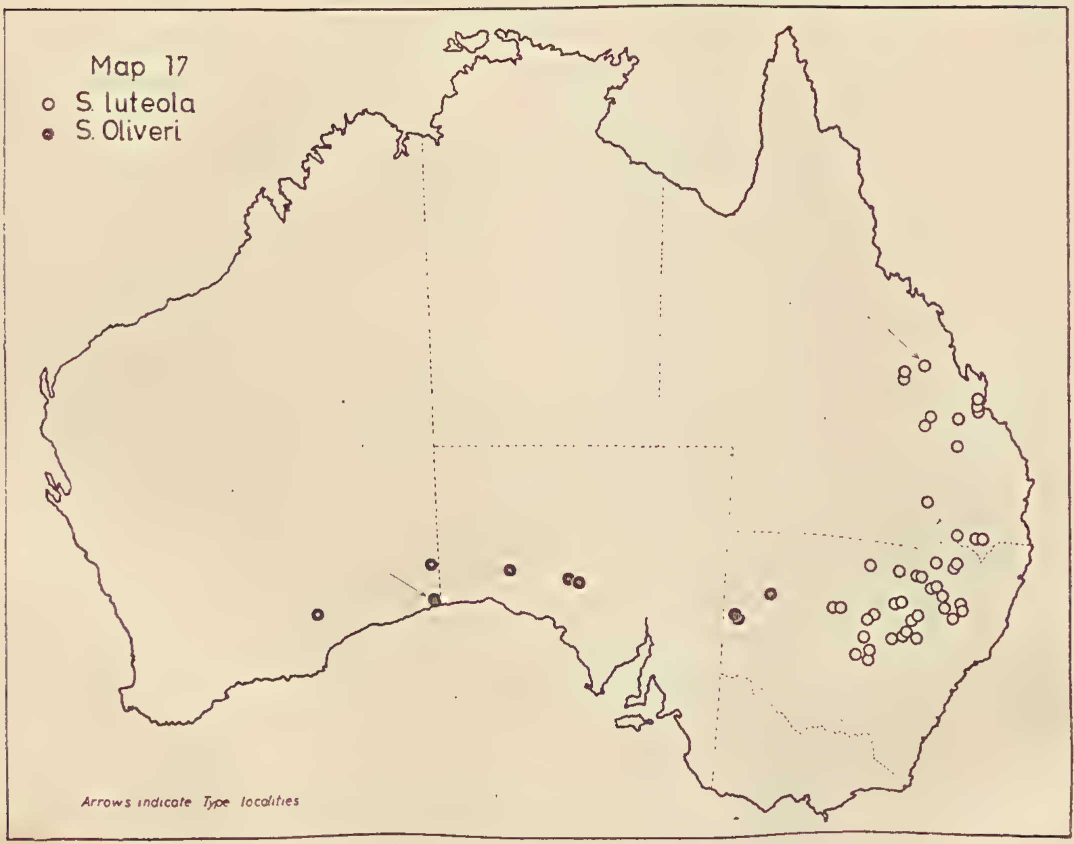
Prostrate plants forming mats often 20-50 cm. in diameter, or shortly ascending, with a pubescence varying from sparse to moderately dense (as in the Types and others), the hairs fine, loosely adpressed, basifixed. *Leaves* 3.5-12 cm. long often 5 or 6 cm., with 9-17 leaflets (usually 11-13 as in the Types). *Leaflets* narrow-elliptical to elliptical, or oblanceolate to narrow-obovate, the apex obtuse, 7-20 mm. x 3-10 mm. but usually 7-10 mm. x 3-5 mm. (7-9 mm. x 4 mm. in the Types), glabrous or with a few scattered hairs above, pubescent below with short, adpressed or with longer, looser hairs. *Stipules* narrow from a rather broad base, usually 3-5 mm. long (1.5-2 mm. in the Types; to 6 mm. in others), variously pubescent like the leaves. *Raceme* insignificant, 3-8 cm. long with 5-15 flowers occupying one-half, or usually more, of its length (in the Holotype the raceme is about 3.5 cm. long with 6 flowers). *Flower* 6-8 mm. long on a pedicel of about 1 mm. usually equalled or slightly exceeded by the bract; colour apparently very variable and perhaps unstable; field notes record "both pink and purple", "blue", "dark purple" and "yellow to deep blue." *Calyx* 3-4 mm. long, almost glabrous, to rather densely pubescent as in the Types and others, with narrow teeth 1-2 mm. long, and a pair of minute bracteoles usually less than 1 mm. long at its base. *Standard* (Fig. 48a) not erect as in most species of *Swainsona*, but more or less prone along the wings and keel, 5.5-9 mm. long with a claw 1-2.5 mm., and usually narrower than long by 0.5-1 mm.; calli absent. *Wings* (Fig. 48b) very small, 4-5.5 mm. long, only 1 mm. broad, the claw 1-2 mm. *Keel* (Fig. 48c) exceeding the wings, obtuse, 5 (Holotype and others)-8.5 mm. long, the claw 2 (Holotype)-3.5 mm. long, without pouches or folds. *Ovary* (Fig. 48d) completely glabrous, or with a line of hairs along the suture, or densely adpressed-pubescent with short white hairs (as in the Holotype and others), 3-5 mm. long at anthesis, almost sessile. *Style* bearded chiefly in the upper part with short hairs, the tip coiled (Fig. 48d). *Fruit* cylindrical, mostly 20-35 (Holotype 25-30) cm. long, 3-5 mm. in diameter, inflated at first but finally the suture intruded reducing the diameter (in the Holotype 6 mm., the suture not yet intruded), glabrous or pubescent like the ovary, often prolifically formed.

Flower colour in this species is of interest because of the epithet given it by Mueller. Whether the flowers of the Holotype were yellowish as the epithet suggests, or whether the description was compiled after the specimen had dried and the flowers changed colour, is uncertain; but there is no doubt, from tints remaining in most dried flowers, that the predominant colour throughout the species is some shade of purple. Enquiries from observers familiar with the species in the field elicited replies that (1) the flowers are always bluish to purplish but turn yellow quickly on drying, and (2) that there is no recollection of the plant bearing yellow flowers, but that they are always blue or heliotrope. The second report came from Clermont, Q., not far from the Type locality.

On the other hand, records such as "flowers both pink and purple" and "flowers of yellow to deep blue" suggest variation or instability in colour, not uncommon in the genus though usually ranging only between blue, purple and red.



Figs. 48a-c. *S. luteola* : 48a. standard ; 48b. wing ; 48c. keel ; 48d. pistil with coiled style tip. (All x 7.)



Distribution: See Map 17, derived from the Type and representative localities among the following specimens:—

Queensland: Colin Downs, Clermont, Kearney, 5.3.1941; Makouda, Clermont, Seton, 28.10.1935; BRI. Rockhampton, Dietrich 599; do., Thozet 989; do., Bowman; Comet R., O'Shanesy 5002; MEL. Dawson R., Bancroft; Rolleston, Ogg, 11.11.1931; BRI. Theodore, D. J. Lee, 5.9.1941, *165;* NSW. Plevna Downs, Warrego district, Everist, 31.10.1939; BRI. Inglewood, Boorman, 9.9.1910, *166*; do., Boorman, 3.1911, *167*; NSW. Wyaga, Goondiwindi district, C. T. White, 9.1919; BRI.

New South Wales: Mt. Mitchell, Warialda, Loder, 1.1916, *168*; 8 miles from Warialda, Woollett, 23.10.1929, *169*; Warialda, Boorman, 7.1905, *170*; Moree district, Cheel, 28.12.1928, *171*; Brewarrina, Insp. of Stock, 28.10.1908, *172*; Walgett, G.V.R.S., 28.9.1937, *177*; Burren Junction, Inspector of Stock, 2.11.1908, *178*; do., Warburton, 8.1921, *179*; Narrabri, per Dept. Agric. Stock and Brands, 19.1.1909, *180*; do., Breakwell, 8.1913, *181*; Boggabri, Cambage 3610, 10.1912, *182*; Tamworth, Boorman, 6.1904, *184*; Tamworth district, Stock Insp., 11.11.1903, *183*; NSW. Coonamble, Cleland, 10.1914 (dup. NSW *184A*); AD. do., Lindsay, 9.1911, *680*; do., G.V.R.S., 12.9.1939, *185*; do., Proctor, 10.1914, *186*; Gunnedah, W. L. Waterhouse, 3.1914, *193;* do., Boorman, 9.1910 (*bis*), *192* and *191;* do., Boorman, 10.1914, *190*; do., Boorman, 8.1907, *189*; do., Cleland, 2.1911, *188*; do., Nowland, 6.1905, *187;* Warrumbungle Ra., Kaleski, 1.9.1937, *195;* Breeza, Stock Dept., 10.1908, *194;* Near Cobar, Abrahams 462, 9.1910, *196*; Cobar Reuss, 6.1921, *197*; do., Abrahams 177, 7.9.1911, *198*; Nyngan, Inspector of Stock, 3.1908, *199*; Tooraweenah, per Sydney Mail, 26.9.1903, *201*; do., Brodie, 7.6.1939, *200*; Hermidale, G.V.R.S., 14.10.1941, *202*; Dubbo, Betche, 19.9.1885 (dup. MEL., labelled: Near Dubbo, No. 18), *203*; Dubbo district, G.V.R.S., 25.8.1941, *207*; NSW. Castlereagh and Mudgee, Woolls; MEL. Narromine, Maiden, 9.1898, *210*; Narromine (Burroway), Scott, 9.1898, *209*; do., Scott, 11.1898, *208*; Victory Vale via Condobolin, Fawkes, 6.1921, *204*; Bobadah via Condobolin, Miller, 17.7.1908, *205*; Condobolin, Todhunter, 7.1913, *206*; NSW. Lachlan's R., Woolls 6, 1878; Lachlan R., Woolls; MEL.

THE MONTICOLA GROUP.

S. parviflora, S. monticola and *S. recta.*

These three species constitute an *Artenkreis* in which *S. parviflora* is the northern member, and the other two southern with easterly and westerly tendencies respectively. *S. recta* has the most southerly range of the three.

Phenotypic discontinuity is almost complete and there has been little difficulty in the determination of the sixty specimens of the group which have been collected. All the species have small flowers, a more or less acute keel and a short and sometimes obscure group or line of hairs behind the stigma. Their differences are summarised in Table XIV.

TABLE XIV.

Species.	Habit.	Leaflets.	Keel.	Ovary.	Style Tip.
S. parviflora ...	Slender, decumbent.	5–11 per leaf, usually 5–7, very narrow-elliptical or narrow-lanceolate.	Narrow-obtuse to subacute.	Pubescent all over (fig. 50).	Inflexed to geniculate with very short hairs along the back of the terminal segment, as well as the ventral beard.
S. monticola ...	Loosely ascending to decumbent.	11–26 usually 17–21, linear-cultrate, often retuse.	Narrow-obtuse but scarcely beaked.	Quite glabrous or with short adpressed hairs on the sides near the base (fig. 49).	Shortly inflexed or incurved with a short tuft or beard outside as well as the ventral beard.
S. recta	Stiffly erect, slender.	7–11, narrow-elliptical.	Acute	Glabrous except for a line or band of hairs along the suture (fig. 51).	Shortly pointed, inflexed (or if broken, truncate) with a short beard behind the stigma as well as the ventral beard.

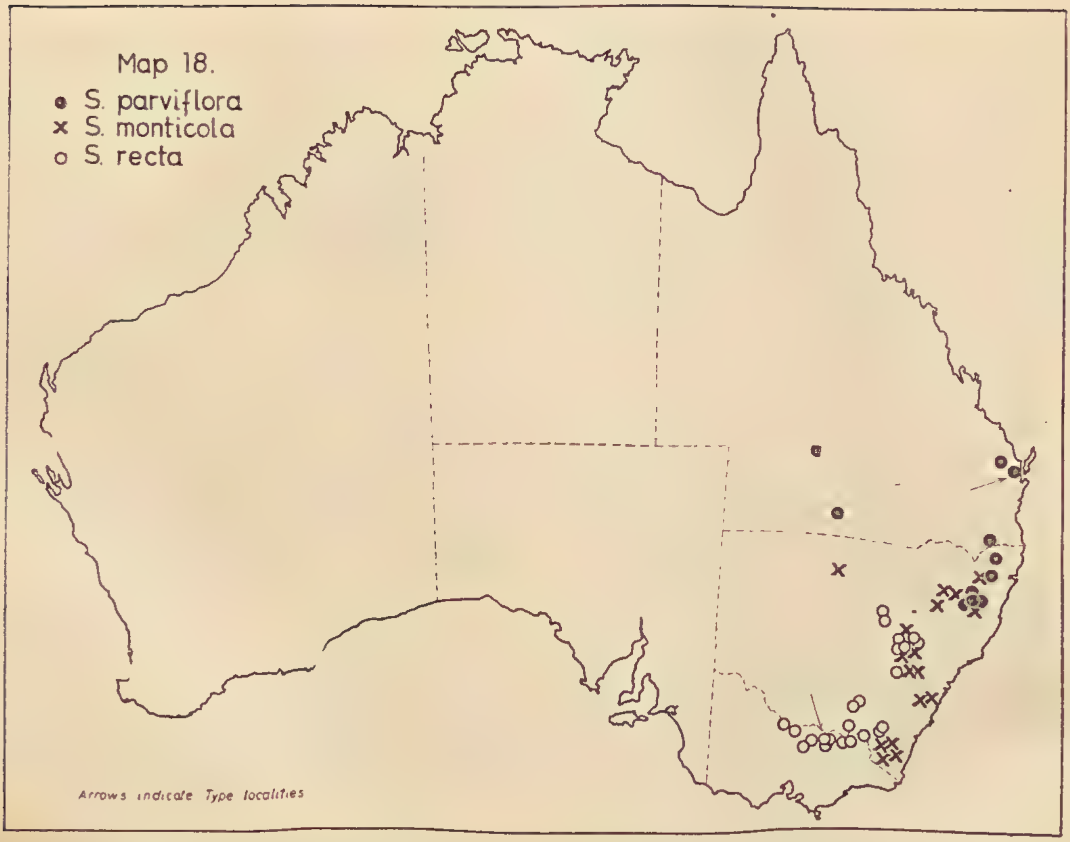
There is considerable resemblance between the species of this Group and the next species, *S. microphylla* q.v. The small fruits of all are similar but those of the MONTICOLA Group have the suture intruded, at least for part of the length, and some pubescence is present on the ovary, while that of *S. microphylla* is glabrous with the suture not intruded except very rarely.

49. **S. parviflora** Benth., Fl. Aust. 2: 223, 1864.

HOLOTYPE, by monotypy, not seen; examined and reported on by V. S. Summerhayes: Wide Bay, NE Australia, (Qd.), Bidwell 105; K. (A second specimen at Kew is probably a Haptotype, its label being, in the opinion of Summerhayes, an erroneous copy of that on the Holotype sheet. It reads "Wide Bay, No. 2 Australia, *Bidwell* Hooker 1851" in Herb. Benthamianum).

HOMOEOTYPE, *fide* C. T. White at K, 19.9.1939: Mount Perry, Jas. Keys 602; BRI.

EQUIVALENT SYNONYM: *S. parviflora* var. *vestita* White and Francis, Proc. Roy. Soc. Qd. **37**: 156, 1926. *Holotype*, by Monotypy: Near Adavale, Western Queensland, MacGillivray, 28.8.1923; BRI.



Small, loosely ascending perennials with a woody rootstock and stems up to 25 cm. long, very sparsely pubescent with short, white hairs or glabrescent, or (in two inland localities) more densely adpressed-pubescent. *Leaves* 4-7 cm. long with 5-11 (commonly 5-7) leaflets. *Leaflets* very narrow-elliptical or narrow-lanceolate, the terminal leaflet distinctly longer than the adjacent laterals; in the Homoeotype the terminal leaflet is up to 36 mm. long, the laterals to 20 mm., and in the Holotype one terminal leaflet measures 45 mm.; in other specimens measurements are 10-40 mm. (terminal) and 7-27 mm. (laterals); breadth commonly 1 mm. or less to 3 mm.; pubescence may be present on both surfaces. *Stipules* deltoid, 1-3 mm. long, usually less than 2 mm. *Raceme* 8-18 cm. long (often 10-15 cm., in the Homoeotype 18 cm.), with 4-13 flowers (often 5 or 6) occupying one-third or less of the length. *Flowers* purple, mauve, or blue, 5-7 (usually 6) mm. long, on a slender, densely short-pubescent pedicel 2-4 mm. long, which distinctly exceeds the small bract of 1 mm. *Calyx* pubescent with white or less commonly brown hairs, glabrescent, 2.5-4 (Homoeotype 3) mm. long, the teeth barely 1 mm. to 2 mm. long, the bracteoles attached to the calyx-base or the pedicel, less than 1 mm. long. *Standard* 6-10 mm. long and broad, often slightly broader than long (7 mm. x 6 mm. in Homoeotype), the claw 2 mm. long with or without a pair of parallel thickened ridges just above it. *Wings* with nearly parallel sides, or expanding slightly near the apex, 5 (as in the Homoeotype)-8 mm. long, the claw 1.5-3 mm. *Keel* narrow-obtuse or subacute, 5 (Homoeotype)-7 mm. long, the claw 2-3 mm., with or without a pair of folds above it. *Ovary* (Fig. 50) adpressed-pubescent all over, 2-2.5 mm. long at anthesis, on a gynophore about 0.5 mm.

long. *Style* bearded chiefly in the upper half, the tip (Fig. 50) inflexed or geniculate and shortly bearded along the back of the inflexed segments. *Fruit* rounded-oblong in outline, 10-20 mm. long, 6-8 mm. in diameter, the upper surface broadly indented along the suture at maturity, the pericarp firm.

DISTRIBUTION: See Map 18, derived from the Holotype and representative localities among the following specimens:—

Queensland: Mt. Perry, Keys 602; BRI. Wide Bay, No. 2 Australia, Bidwell, Hooker, 1851*; K. Near Adavale, MacGillivray 991, 28.8.1923; Gilruth Plains near Cunnamulla, Everist 1646, 17.9.1938; Silverwood near Warwick, C. T. White 1724, 9.1922 (dup. NSW *215*); BRI.

New South Wales: Near Tenterfield, N.S.W., coll. C. Stuart, from A. R. Riley*; K. Deepwater, Boorman, 10.1901, *218*; Arding near Armidale, Davis, 29.10.1943, *214*; Castle Doyle, Armidale, Martin, 10.1915, *219*; Armidale, Martin, 2.1916, *216*; near Armidale, Blakely and McKie, 31.10.1929, *217*; NSW.

50. **S. monticola** A. Cunn. ex Benth., Fl. Aust. 2: 223, 1864.

The citation of author for this name presents some difficulty. Bentham published his description under the heading "*Swainsona monticola* A. Cunn.; A. Gray, Bot. Amer. (*recte* U.S.) Expl. Exped. 1.411.", this being the method used by him for manuscript names and descriptions by the first author published by the second† (see *Acacia siculiformis* Fl. Aust. **2**; 329; *A. hippuroides* Ibid. p. 342). Gray, however, published neither a name ascribed to Allan Cunningham nor a description. Cunningham indeed is not known to have published, effectively or validly, any names in connection with this species, though both he and his brother Richard had specimens of it in their Herbaria labelled *Lessertia monticola*.

It is therefore assumed, since Bentham attributed the name *S. monticola* to Allan Cunningham, notwithstanding his knowledge of and reference to its publication by Gray, that Cunningham must have proposed the combination to Bentham in a personal communication previous to Gray's publication.

LECTOTYPE, not seen; examined and reported on by V. S. Summerhayes: "Blue Mountains A. C(unningham)"; K.

LECTOPARATYPE, not seen; examined and reported on by V. S. Summerhayes: "Blue Mountains, New Holland, R. Cunningham"; K.

Of the other syntypes cited by Bentham, McArthur's (*fide* Summerhayes), and C. Moore's belong to *S. recta* (see below), and R. Brown's specimen cited as "Cow pastures" has not been located.

A small, loosely ascending perennial, often with a thick, woody rootstock and stems 15-25 cm. long, sparsely adpressed-pubescent with short white hairs basifixed or laterally attached at the base. *Leaves* 3-8 (usually 4-6) cm. long with 11-26 leaflets, the mature leaves usually with 17-21. *Leaflets* linear or cultrate, the apex truncate or more commonly retuse, gradually decreasing in size toward the leaf-apex, the terminal leaflets only slightly longer than the adjacent laterals, 3-16 mm. long but commonly 5-9 mm., 1-2 mm. broad, glabrous above, sparsely pubescent on the underside. *Stipules* short, more or less deltoid and 3 mm. long, to longer and narrower resembling the leaflets, up to 10 mm. long. *Raceme* usually 10-15 cm., sometimes over 20 cm. long with about 10 flowers (5-17) occupying about one-third or less of the length. *Flowers* purple or mauve, 5-7 mm. long on a slender pedicel mostly 3-4 mm. long in the axil of a bract 1-2 mm. long; pedicel and calyx usually dark-haired. *Calyx* 3-4 mm. long, the teeth 1-2 mm. mostly shorter than the tube, the bracteoles often obscure, under 1 mm. long, attached at the base of the calyx or on the pedicel. *Standard* 6.5-8 mm. long and broad, the claw 1.5-2.5 mm. long; calli absent. *Wings* 7 mm. long; the claw 1.5-2.5 mm., the sides more or less parallel. *Keel* narrow-obtuse but very rarely beaked, 4.5-6.5 mm. long, the claw 2-3 mm. with a pair of folds poorly developed or absent. *Ovary* (Fig. 49) quite glabrous or more commonly with very short, adpressed hairs on the sides below the middle or near the base, 2-3 mm. long at anthesis, the gynophore about 0.5 mm. long. *Style* much incurved over the ovary, the beard rather sparse and chiefly in the upper half, the tip (Fig. 49) shortly inflexed or incurved with a short beard or tuft of hairs outside the incurved part. *Fruit* often prolifically formed, rounded-oblong in outline, about 9-13 mm. long, 3-4 mm. in diameter, the upper surface broadly indented, the pericarp firm.

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*Not seen; determination by V. S. Summerhayes.

†Bentham also used this method of citation for a number of validly published Linnean names, as in "*Phaseolus vulgaris* Linn.; DC. Prodr. ii.392" Fl. Aust. **2**: 257), where the second (DC.) reference is to an additional description.

Distribution: See Map 18, derived from representative localities among the following specimens:—

New South Wales: Glen Innes, Parker, 11.1912, *236*; Bourke district, McDougall, *234*; Armidale, Davis, 29.10.1943, *237*; Gunnedah, Betche, 17.10.1886 (*bis*; dup. MEL), *238*; *248*; Ironbark Ck., Barraba, Rupp, 10.1913, *239*; George's R., Staer, 10.1910, *240*; do., Staer 11.1910, *241*; NSW. Gulgong, Barnard 173, 1882; Hill End, Lauterer, 9.1885; MEL. Wellington Valley, N.S.W.*; K. Bathurst, Deane, 11.1886, *244*; Bathurst, Deane, *243*; George's Plains, Boorman, 11.1906, *242*; NSW. Campbelltown, Alkin; BRI. Campbelltown, N.S.W.*; K. Cooma, Betche, 12.1890, *245*; do., Deane, 12.1887, *249*; Nimitybelle to Cooma, Maiden, 12.1896, *246*; Cooma district, G.V.R.S., 26.10.1936, *247*; NSW. Quiedong, Bauerlen 491, 4.1887; MEL.

Also the following, not mapped: No. 97, with second label: Collected in Australia by Allan Cunningham and Others, 352 from H. C. Watson; MEL. Nov. Holl., Bauer (Herb. Mus. Vind.)*; N. Holland, Clowes, Sydney*; Iter Australiense, Brown, 1802-5, No. 4165*; K.

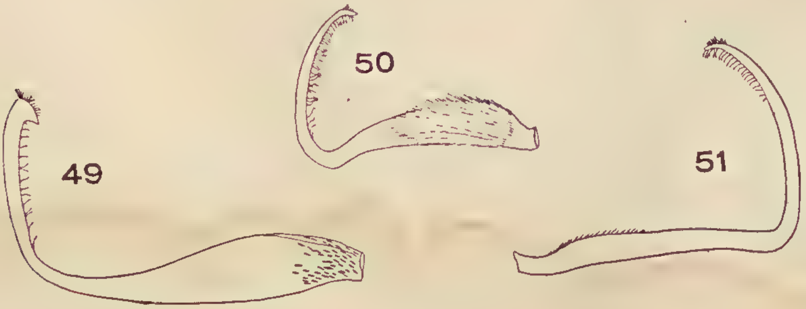

Fig. 49. *S. monticola* : pistil, the ovary with hairs on the sides near the base. Fig. 50. *S. parviflora* : pistil, the ovary pubescent all over. Fig. 51. *S. recta* : pistil, the ovary pubescent on the suture only. (All x 7.)

51. **S. recta** sp. nov.

Holotype: Wangaratta, Vic., M. Henly, 11.1891; MEL (*Haptotypes* MEL; NSW *223*).

Paratype: George's Ck. near Tallangatta, Vic., C.W., 10.1891; MEL (*Haptoparatype* NSW *231*).

A slender, somewhat rigidly erect perennial with a woody root sometimes more than 15 cm. long and few stems 12-35 cm. long (often 20-30 cm.), very sparsely hoary with short, adpressed, basifixed hairs. *Leaves* 3-9 cm. long with 5-13 leaflets, commonly 5-7 cm. with 7-11 leaflets as in all the Types. *Leaflets* narrow- to very narrow-elliptical, the few hairs only on the underside; terminal leaflets distinctly longer than their adjacent laterals, 15-25 and 7-20 mm. respectively, commonly 20 mm. and 10-15 mm.

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*Not seen; det. V. S. Summerhayes.

as in the Types, often 1 or up to 3 mm. broad. *Raceme* 10-27 cm. long (15-22 cm. in the Holotype), the peduncles straight and firm, with 10-21 flowers (10-15 in the Holotype) occupying about one-half of the length. *Flowers* purple or bluish, 5-6 mm. long, often hanging vertically along the peduncle on recurved pedicels 1-3 mm. long which are subtended by a bract of about the same length. *Calyx* 3-4 mm. long, sparsely pubescent with short adpressed, usually dark hairs, the teeth 1-1.5 mm. long, shorter than the tube, bracteoles 1 mm. long or less, attached to the base of the calyx or to the pedicel. *Standard* 7.5-9.5 mm. long and broad, the claw 2-3 mm. long, often with short, slightly thickened parallel ridges above it. *Wings* 7-8 mm. long, the claw 2-3 mm., the apex of the lamina broadly expanded, more or less rotund. *Keel* acute, 5 (as in all the Types)-7.5 mm. long, the claw 2.5-3 mm. with a pair of folds or small pouches above it. *Ovary* (Fig. 51) glabrous except for a line or band of adpressed hairs along the suture, especially near the base, 2-3 mm. long at anthesis on a very short gynophore 0.5 mm. or rarely up to 1 mm. long. *Style* (Fig. 51) shortly bearded, chiefly in the upper part, with a beard of short hairs behind the short, pointed, inflexed tip, or appearing truncate with a small tuft when the tip is broken off, as is frequent in old flowers. *Fruit* roughly rounded-oblong in outline, 7-11 mm. long, 4-6 mm. in diameter, the suture slightly intruded in the distal half of the pod, in the proximal half not intruded, ridged, the pericarp firm, sometimes finely reticulate, glabrous except for persistent white hairs along the suture and near the base.

Plantae perennes rigidiores rectae caulibus paucis saepe 20-30 cm. longis, sparsissime vestitae pilis brevibus adpressis basifixis. *Folia* 3-9 (saepe 3-7) cm. longa foliolis saepe 7-11. *Foliola* angusto-vel angustissimo-elliptica, supra glabra, extrema saepe 20 mm. longa, lateralia (circa 10-15 mm. longa) maxime excedentibus, omnia 1-3 mm. lata. *Flores* circa 10-20 in racemorum 10-27 cm. longorum superiore dimidio purpurei vel caerulei, 5-6 mm. longi saepe verticales in pedicellis recurvis 1-3 mm. longis, tam longis quam bracteae. *Calyx* 3-4 mm. longus pilis brevibus fuscis adpressis sparse pubescens, dentibus quam tubus brevioribus 1-1.5 mm. longis, bracteolis 1 mm. longis. *Vexillum* 7.5-9.5 mm. longum et latum ungue 2-3 mm. longo, saepe jugis parallelis brevibus duobus. *Alae* 7-8 mm. longae, ungue 2-3 mm., apice late rotundae. *Carina* 5-7.5 mm. longa sacculis vel rugulis duabus, ungue 2.5-3 mm. longo. *Ovarium* glabrum nisi in linea secundum suturam praestertim ad basim, anthese 2-3 mm. longum in gynophorio raro ad 1 mm. longo. *Stylus* breviter barbatus et cristatus pilis brevibus post apicem breviter inflexum. *Legumen* 7-11 mm. longum, 4-6 mm. diametro, sutura vix intrusa.

DISTRIBUTION: See Map 18, derived from the Types and the following specimens:—

New South Wales: Gulargambone, Cadell, 9.1886, *224*; Trangie, Abrahams 542, 10.1911, *225*; NSW. Castlereagh and Mudgee, Woolls; MEL. Mudgee, Deane, 10.1885, *232*; Wellington, Althofer, 10.1939, *226*; do., Betche, 6.10.1886, *227*; NSW. do., Moore 23, 6.10.1886; Between Carcoar and Canowindra, Moore, 10.1888; Wagga Wagga, Hammond, 1885; MEL. do., Helms 78, 11.10.1900, *228*; Canberra, Melvaine, 10.1939, *229*; Queanbeyan, Deane, 12.1887, *233*; Culcairn, Dwyer, 29.9.1930, *230*; NSW.

Victoria: Upper Murray, C. French Jnr., 1886; Wodonga, Murray R., C. French Jnr., 1886; Murray R., H. King, 1891; do., Vic., H. King, 1892; Ovens R., Henley, 11.1891; do., Henley. 1895; Tamleugh, Goulburn Valley, Minchin, 1886; Near Murchison East, Mather, 22.9.1903; MEL.

ILLUSTRATION: Maiden, Ill. N.S.W. Pl. **3** t.27, 1911 (*sub S. monticola*).

S. MICROPHYLLA.

This species constitutes another *Rassenkreis* comparable with *S. oroboides*; it occupies a large area and shows a great deal of variation, several of the variants reaching a degree of discreteness which justifies their recognition as subspecies.

There is some likeness to the MONTICOLA Group—e.g., the shortly tufted style tip of that Group is found here, there are similarities in pubescence and some of the fruits of *S. monticola* and *S. recta* are very similar to the peculiar little subglobular to ovoid fruits of *S. microphylla*—and these similarities probably indicate a true relationship.

52. **S. microphylla** A. Gray, U.S. Expl. Exped., Botany, 1:410, 1854.

HOLOTYPE, by monotypy, photograph and dissected flower only seen by the writer, the specimen reported on by Dr. E. H. Walker: Hunter's R., New South Wales, Herb. U.S. Expl. Exp.; US.

HOMOEOTYPE, *fide* E. H. Walker: Tamworth, Rupp, 9.1904, *713*; NSW.

TYPE SUBSPECIES: *S. microphylla* ssp. *microphylla.*

A polytypic species of six races differing in characters of pubescence, leaflet number and shape, and of style tip. Plants very variable in size, the pubescence also variable but the hairs always basifixed, with small purple or pinkish flowers, and obcordate to oblong-retuse, often small leaflets. The species is chiefly characterised by the small, almost globular, glabrous fruits with no intrusion of the suture, and by the tuft or ring of hairs behind the stigma on the truncate, shortly incurved or inflexed-pointed style tip.

The species as here constituted is of wide distribution throughout the central and southern parts of the whole continent, and like most of the widespread species, exhibits considerable variation. The variation is, however, largely discontinuous, and a number of distinguishable populations are found. Some of these are of limited distribution and are fairly uniform within their area of occupation, others are more variable and of wider distribution.

Within the species the most apparent variation is in the following characters:—

Style tip: May be truncate with a ring of short hairs around the capitate stigma, or extended forward into a pointed tip with hairs along the tapered section, which may be straight, minutely curved inwards or inflexed.

Pubescence: May be almost absent to dense, the hairs very short to rather long, closely adpressed to spreading. With familiarity a distinction can usually be drawn between the slightly flattened or scale-like hairs of ssp. *affinis,* and the finer hairs of ssp. *microphylla.* Short hairs are usually closely adpressed (except in ssp. *tomentosa*) and longer ones lie more loosely on the leaf surface.

Leaflet number: While every plant shows some variation in the number of leaflets per leaf, there is a fairly distinct break between ssp. *affinis* with few leaflets (usually 11-15) and the other subspecies with numerous leaflets (usually 21 or more).

Flower colour: While most variants in the species seem to have the blue or purple flowers common in the genus, few specimens bear field notes on the subject, and in some the dried flowers are pale and the colour quite indeterminate. In ssp. *pallescens* however, several sheets bear field notes indicating that the flowers were white or yellow, and all the unannotated specimens have dried a similar pale colour without any trace of purple. White or yellow flowers thus appear to be the rule in this subspecies, though they may perhaps occur sporadically in others as well.

Flower size: There is a tendency for a more or less uniform flower size to prevail within localised populations, but there are usually a number of exceptions; on the whole, ssp. *microphylla,* ssp. *tomentosa* and ssp. *minima* have smaller flowers than ssp. *affinis,* ssp. *glabrescens* and ssp. *pallescens.*

Due to the occurrence of six combinations of fairly clear-cut variations in these characters, the six named variants can be distinguished with a small percentage of arbitrary decisions, but similarity in floral structure and in the fruit holds them together as a single species.

KEY TO THE SUBSPECIES.

1. Pubescence almost absent to moderately dense, the hairs adpressed, or loosely adpressed when longer and denser.
    2. Leaflets 17 to more than 30, usually at least some leaves with 21 or more; pubescence sparse.
        3. Style tip truncate, with a ring of hairs around the capitate stigma (sometimes only a tuft at the top remaining), see Fig. 53a; pubescence sparse; area between Castlereagh R., Wellington and Hunter R. .... a. ssp. *microphylla.*
        3.* Style tip with a tapered terminal segment, extended straight forward, as in Fig. 52a or slightly inflexed or incurved, with short hairs along tho back of the tapered segment.
            4. Flowers (?usually) purple or blue; leaflets small, 1-5 usually 2-3 mm. long, 1-3 mm. broad, often obcordate-rotund, rather thick, almost glabrous; Central Australia, W.A. .... b. ssp. *glabrescens.*
            4.* Flowers (?always) yellow or white; leaflets large, commonly 6-9 mm. long, with a rather sparse pubescence; Rockhampton district, Q., Central Q., NW N.S.W., Central Australia .... c. ssp. *pallescens.*
    2.* Leaflets 9-21, usually 11-15, pubescence sparse, to rather dense with longer, loosely adpressed hairs; style tip with a tapered terminal segment, usually extended straight forward or very slightly inflexed with hairs along the back of the tapered segment (Figs. 52a, b); very widespread, in Qld., N.S.W., N.T., and W.A. .... d. ssp. *affinis.*
1.* Pubescence dense, at least on the underside of the leaflets, stiffly spreading, at least on the stems, or closely adpressed with short white hairs.
    5. Leaflets pubescent, the hairs more or less stiffly spreading, or at least the pubescence of the stems stiffly spreading; style tip as in ssp. *microphylla* or with a tapered incurved terminal segment, bearded along the back; Western N.S.W., northern Vic., Central Australia .... e. ssp. *tomentosa.*
    5.* Leaflets pubescent with short, closely adpressed hairs; style tip as in ssp. *microphylla;* Lower Murray Valley, N.S.W. .... f. ssp. *minima.*

The diagnostic characters are summarised in Table XV.

a. ssp. **microphylla** (A. Gray sensu orig.) comb. et stat. nov.

HOLOTYPE: As for the species.

ABSOLUTE SYNONYM: *S. microphylla* A. Gray sensu orig.

Rather small, decumbent or ascending herbs or undershrubs with a sparse pubescence of fine, adpressed hairs basifixed or laterally attached at the base. *Leaves* usually 4-6 cm. long with 17 to more than 30 leaflets, nearly always at least some of the leaves with 21 or more leaflets. *Leaflets* (Fig. 53b) often rather angular in outline, narrow-cuneate, usually strongly retuse with or without a point in the notch, more or less sparsely pubescent on both sides but more densely on the underside, 3-5 mm. x 1.5-4.5 mm. *Stipules* narrow-deltoid, 1-3 mm. long, glabrous or with a few hairs inside. *Raceme* varying in length with size of the plant, often 10-20 cm. long with 10-20 flowers occupying about one half of this length. *Flowers* blue to purple, 4-7 mm. (often 6 mm.) long on a dark-pubescent pedicel 1-2.5 mm. long subtended by a bract usually shorter than the pedicel. *Calyx* pubescent with brown, usually dark, hairs 2-3.5 mm. long with short, acute teeth 0.5-1 mm. long; bracteoles said to be wanting in the Holotype in which the racemes are at the early fruiting stage, but present in the Homoeotype and others, very small and sometimes obscured by the pubescence. *Standard* up to 9 mm. long and 8.5 mm. broad or sometimes only 5 mm. long, but

TABLE XV.

Subspecies.	Style Tip.	Pubescence.	Leaflets.	Flower Colour.
microphylla	Truncate or very slightly incurved behind the capitate stigma which is surrounded by a ring of short hairs (Fig. 53a).	Sparse, adpressed	Often angular in outline, narrow-cuneate, strongly retuse, 3–5 mm. x 1·5–4·5 mm. 17 to more than 30 per leaf, usually 21 or more (Fig. 53b).	Blue to purple.
minima	Truncate or very slightly incurved behind the capitate stigma which is surrounded by a ring of short hairs.	Dense, closely adpressed	Very small, obcordate, 1·5–4 mm. x 1–3 mm. Usually more than 30 per leaf (Fig. 56).	Blue to purple.
tomentosa	Ditto, or slightly extended and incurved (Fig. 54a) with short hairs along the back of the incurved segment (Fig. 54a).	More or less dense, the hairs short, stiff and spreading; erect, at least on the stems.	Narrow-cuneate, retuse to almost obcordate, 2–7 mm. x 1·5–3 mm. 15–41 per leaf, usually 19–21 (Fig. 54b).	Blue to purple.
affinis	With an extended, tapered terminal segment, usually straight, sometimes slightly inflexed, with short hairs along the back (Figs. 52a, b).	Almost absent or sparse with short adpressed hairs, to rather dense with longer loosely adpressed hairs.	Oblong or narrow-oblong, retuse, 4–13 mm. long, often 6–9 mm. x 3–5 mm. 9–21 per leaf, usually 11–15.	Blue to purple.
glabrescens	With an extended, tapered terminal segment, usually straight, sometimes slightly inflexed, with short hairs along the back.	Almost absent, the hairs few, adpressed.	Small, rather thick, obcordate-rotund or oblong, retuse, 1–5 mm. long, usually 2–3 mm. x 1–3 mm. Numerous per leaf, 21 or more, up to 43 (Fig. 55).	Blue to purple.
pallescens	With an extended, tapered terminal segment, usually straight, sometimes slightly inflexed, with short hairs along the back.	Sparse, adpressed	As in ssp. *affinis*, except that there are 21 or more per leaf.	Yellow or white.

commonly 7 mm. x 6 mm., without calli, the claw 1.5-3 mm. long. *Wings* 5-7 mm. long, rarely 8 mm., the claw 1.5-2.5 mm. long. *Keel* obtuse to subacute, 4.5-6 mm. long, rarely up to 8 mm., the claw 1.5-2.5 mm., with or without a pair of shallow folds near the auricle. *Ovary* (Fig 53a) glabrous, 1.5-3 mm. long on a gynophore 1 mm. long or less at anthesis with about 6 ovules. *Style* (Fig. 53a) with a sparse beard, slightly thickened upwards, or at least not tapering at the apex, the tip straight or very slightly incurved behind the capitate stigma which is surrounded by a ring of short hairs. *Fruit* small, inflated and subglobular, the suture not or very rarely intruded, the style base persisting as a short beak on the upper surface, 5-10 mm. long, 4-5 mm. in diameter, glabrous, as in ssp. *affinis* (Fig 52c).

DISTRIBUTION: See Map 19, derived from the Type and the following specimens:

New South Wales: Tamworth, Rupp, 9.1904, *713*; Murrurundi, Blakely, 12.10.1911, *714*; Blandford near Murrurundi, Rupp, 2.10.1944, *715*; NSW. Moonan Brook, Hunter R., Carter, 1.1885; MEL. Northbridge, Sydney, transplant from "Belmont," Moonan Flat, Upper Hunter R., Rupp, 11.9.1940, *712*; Wellington, Betche, 6.10.1886, *716*; NSW. Scone, (Cleland), 24.10.1917; JBC. Castlereagh and Mudgee, Woolls; MEL.

b. ssp. **glabrescens** ssp. nov.

HOLOTYPE: Near Barrow Ra., W.A., Camp 33 E.E.E., Helms, 17.8.1891, *717*; NSW (*Haptotype* AD).

Differs from ssp. *microphylla* in the tapered style tip like that of ssp. *affinis* below (Figs. 52a, b) in the small, rather thick leaflets (Fig. 55) 1-5 (usually 2-3) mm. long, 1-3 mm. broad, often almost glabrous, obcordate-rotund or oblong-retuse, and up to 43 in the leaf, and also in the slightly larger flower parts. The plants also appear to be more robust, on the whole. From other subspecies with a tapered style tip it differs in the character of its leaflets which are smaller than those of ssp. *affinis* and ssp. *pallescens* though approaching the latter; its more numerous leaflets per leaf are a further distinction from ssp. *affinis*. The style tip and sparse pubescence distinguish it from ssp. *tomentosa* and ssp. *minima*.

Ab ssp. *microphylla* in styli apice acuto interdum incurvo, in foliolis parvis, crassiusculis, obcordatis vel rotundis, glabris vel fere glabris, in folio ad 43, et plerumque in floris partibus paulo majoribus, differt.

DISTRIBUTION: See Map 19, derived from the Type and the following specimens:—

Northern Territory: Near Mt. Cockburn, Nicker, 1938; JMB. (River Flats under) Mt. Sonder, Tate, 1894 (dup. NSW *718*); AD. Alice Springs, H. Kempe, 1882*; MEL. Between Middleton's Ponds and Liddle's, (Cleland), 7.6.1935; JBC. Central S. Aust.*; AD.

South Australia: Ernabella, Brumby, 1937; Ernabella, Rocky Hill, (Cleland) 24.9.1945; JBC. 70 miles W. of Camp 17 E.E.E., Ramsay, 7.1891; AD. Scrub NE of Lake Gairdner, Babbage; MEL.

Western Australia: 12 miles W. from Barrow Ra., Lindsay, 12.8.1891; AD. Golden Valley, Merrall, 1888; Sources of Blackwood R., Cronin, 1893; MEL.

c. ssp. **pallescens** ssp. nov.

HOLOTYPE: Herbert's Ck., Qd., Bowman; MEL. (*Haptotype* NSW *732*).

Differs from ssp. *microphylla* in its larger leaves, 3-9 cm. long, and leaflets, 3.5-12 mm. long, oblong or narrow-oblong, retuse, its white or yellow flowers, its tapered style tip (as in ssp. *affinis* below, Figs. 52a, b), and the slightly larger flower parts in most specimens.

This group approaches ssp. *glabrescens* but is distinct in its flower colour, somewhat denser pubescence and larger, thinner leaflets. It has been collected chiefly

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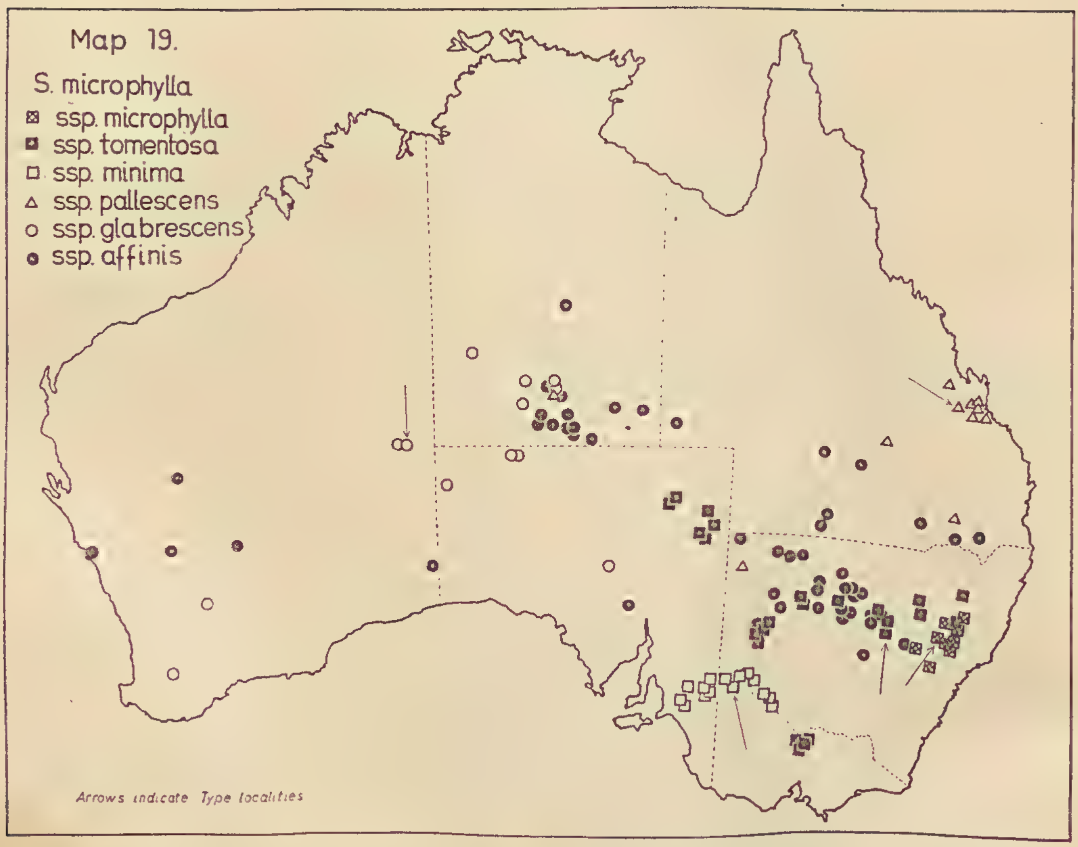
*Separation from ssp. *pallescens* more or less arbitrary.



around Rockhampton, Qd., where it is clearly distinguished from ssp. *glabrescens,* and also from the interior of Queensland and of northern New South Wales, while a few specimens from Central Australia (the focus of ssp. *glabrescens*) are difficult to place in one or other of these two subspecies. From ssp. *affinis,* its chief difference is its greater number of leaflets per leaf, 21 or more, and its flower colour.

Subspecies foliis 3-9 cm. longis, foliolis oblongis vel angusto-oblongis, retusis, 3.5-12 mm. longis, in foliis plusquam 21, in floribus pallescentibus, flavis vel albis, et in styli apice acuto ut in ssp. *affinis,* distincta.

DISTRIBUTION: See Map 19, derived from the Type and the following specimens:—

Northern Territory: Approaching Ooraminna Gap, Tate, 1894; AD.

Queensland: Connor's R., Bowman (*bis*); Westwood, Bowman; Rockhampton; do., Dall(achy); do., O'Shanesy 21; Near Rockhampton, 258, 30.1.1863; Mt. Playfair, Tambo, Biddulph, 1890; E. Australia, Leichhardt; MEL.

? *New South Wales*: Between Darling and Cooper's Ck., Neilson; MEL.

d. ssp. **affinis** ssp. nov.

This is the group for which Maiden and Cheel used the invalidly published name *S. affinis.* It was applied to a figure without description in Illust. N.S.W. Plants, No. 36, by these authors. This plate is among a number of the series which was printed but not published or distributed, except for a very few copies. Several specimens at NSW have been labelled *S. affinis* by Maiden or Cheel, and the name has been used occasionally in publications, but the group has never been described.

Holotype (apparently the specimen illustrated, loc. cit.): Dunlop Stn., W. side of the Darling R., N.S.W., Etheridge 10, 7.1903, *761*; NSW.

Paratypes: (1) Cobar, N.S.W., A. Morris 1197, 17.10.1924, *743*; (2) do., Abrahams 18, ?6.1910, *745*; (3) do., Abrahams 64, 8.1911, *744*; (4) do., Reuss 13A, 11.1921, *746*; NSW.

Plants very variable in size, from 2 to more than 40 cm. high, and in pubescence, from almost glabrous or sparsely pubescent with short, adpressed, often slightly flattened hairs, to quite densely clothed with longer and more lax hairs.

Differs from ssp. *microphylla* in its extended, tapered, usually slightly inflexed style tip (Figs. 52a, b) and in its larger leaflets (as in ssp. *pallescens*), 4-13 mm. long, often 6-9 mm. x 3-5 mm., oblong or narrow-oblong, retuse, and in its leaves with few leaflets, 9-21, usually 11-15, per leaf. This last character, and its purple, pink or blue flowers, distinguish it from ssp. *pallescens* and ssp. *glabrescens;* flower size, usually 7-8 mm. long, is comparable with that of these two subspecies, but greater than in most specimens of the other groups.

Raceme sometimes with more than 30 flowers; *pedicel* usually a little shorter than the subtending bract; *calyx* 3-4 mm. long, the teeth 1-1.5 mm.; *standard* 6-10 mm. long and broad, commonly 8-9 mm., the claw 1.5-2 mm.; *wings* 6.5-8.5 mm., the claw 2 mm. long; *keel* 6.5-8.5 mm. long with a claw of 2-3 mm.; *stipules* acuminate from a rather broad base, 1-7 mm. long; *fruit* as in Fig. 52c.

Subspecies in styli apice acuto, in foliis foliolis paucis (9-21, plerumque 11-15) saepe 6-9 mm. longis, 3-5 mm. latis et in floribus purpureis 7-8 mm. longis, distincta.

Distribution: See Map 19, derived from the Paratypes and representative localities among the following specimens:—

Northern Territory: Wycliffe Ck., Allen 7.1922, *733*; NSW. Near Alice Springs, Flint, 1882; MEL. Ewaninga, (Cleland), 25.8.1931; JBC. Between Camps 6 and 7, S.D.E.; Near Camp 13, S.D.E., 23.6.1939; AD. Bundooma Railway Station, E. C. Black, 8.1936; JMB. Finke, C.A., (Cleland), 25.8.1931; Finke, (Cleland), 8.8.1931; Erldunda, (Cleland), 1.6.1935; Rumbalara, (Cleland), 25.5.1935; do., (Cleland), 8.8.1931; JBC. Rumbalara, E. C. Black, 8.1936; do., Ising, 25.8.1931; JMB. Between Finke R. and Charlotte Waters, H. Kempe, 1885; MEL.

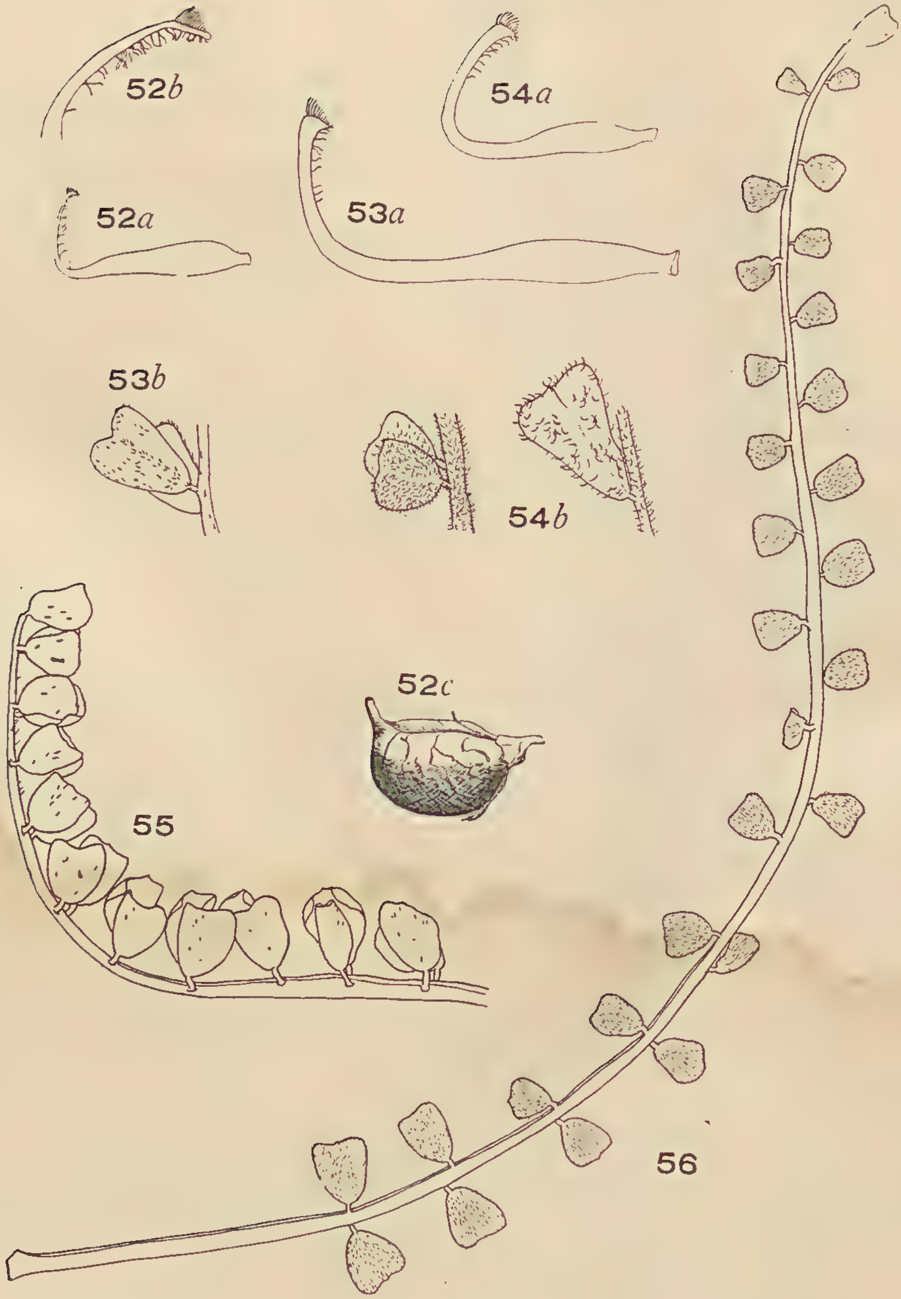
Queensland: Mulligan R., Cornish, 1885; MEL. Near Adavale, MacGillivray, 28.8.1923; Yanna near Charleville, Hutchinson, 3.1934; Wittenburra Stn., 36 miles S. of Eulo, Everist and Smith 35, 6.1.1937; St. George, Wedd; Inglewood, Hirschfeld, 22.2.1936; Goondiwindi, Darling Downs, Mackenzie, 10.3.1942; BRI. Caiwarro, near N.S.W. boundary, Cotter, 11.1886; MEL. Queensland border, N. and a little W. of Broken Hill, MacGillivray, 4.1917, *734*; NSW.

New South Wales: Urisino, MacGillivray, 21.8.1923; BRI. Paroo R. district, Betche, 9.1900, *735*; Mulgany Bore, Ularara Co., Beadle, 8.1941, *676*; NSW. Clover Ck., Bourke, Mackay, 1890; MEL. Tooralc-Goonery, Boorman, 10.1912, *736* (dup. BRI.); Byrock, Boorman, 11.1903, *737*; do., Betche, 2.10.1886, *738*; Coolabah, Maiden and Boorman, 12.1908, *740*; do., Peacock, 9.1898, *739*; NSW. Coolabah, Boorman, 8.1910; BRI. Darling R., Cotter, 4.1887; MEL. Victoria Hotel, Beadle, 9.1939, *741*; Wanganita near Cobar, Abrahams 438, 9.1910, *742*; Cobar, Beadle, 9.1940, *747*; Cobar district, Henry, 10.1921, *748*; Cobar, Abrahams, 4.1910, *750*; NSW. Cobar, Cleland, 14.9.1911; AD. Cobar R., Andra 23, 1883; Cobar, Andra 50, 1883; Tandarlo via Wilcannia, Kennedy, 1886; MEL. Between Wilcannia and Cobar, Pidgeon and Vickery, 26.8.1939, *751*; NSW. Nyngan, Betche 43, 14.9.1883; MEL. Nyngan Expt. Farm, Henry, 16.2.1920, *753*; Nyngan, Carne, 9.1936, *754*; do., Betche, 14.9.1883, *752*; do., Little, 1920, *756*; do., Boorman, 8.1903, *755*; do., Breakwell, 8.1914, *757*; Hermidale per G.V.R.S., 1.2.1928, *758*; Menindee, Beadle, 11.1939, *759*; NSW. Between Wellington and Dubbo; MEL. Palesthan via Condobolin, *760*; NSW.

South Australia: Oakden Hills, Murray 357, 12.11.1929 (dup. JMB); AD.

Western Australia: Meekatharra, Gardner, 8.1929; Wilbah Stn., Mt. Ida near Menzies, Bisset, 7.1933; PERTH. Champion Bay, Guerin; do., Guerin, 1871; Between Lake Moore and Lake Austin, King and Lefroy; 100 miles N. of Eucla, Batt; MEL.

Also not located: Melita, a few miles N. of Tampa, W.A., Jutson, 27.7.1915, *762*; NSW. Darling Desert, Neilson (*sub S. lessertiifolia* var. *tephrotricha* in Fl. Aust.); Glendon (Leichhardt), 20.6.1843; Dupot, Moore; MEL.



Figs. 52-56. *S. microphylla*: Figs. 52a-c. ssp. *affinis*: 52a. pistil; 52b. style tip showing tapered terminal segment with hairs along it behind the stigma; 52c. pod. Figs. 53a, b. ssp. *microphylla*: 53a. pistil showing truncate style tip with ring of hairs around the stigma; 53b. leaflets. Figs. 54a, b. ssp. *tomentosa*: 54a. pistil; 54b. leaflets. Fig. 55. ssp. *glabrescens*: leaf. Fig. 56. ssp. *minima*: leaf. (All x 3.5 except 52b, 53a, and 54a which are x 7.)

e. ssp. **tomentosa** ssp. nov.

Holotype: Narromine, N.S.W., Maiden, 9.1898, *729*; NSW.

Differs from all other subspecies in its pubescence, the hairs being short, usually dense, spreading-erect (at least on the stems if loosely adpressed on the leaflets); leaflets (Fig. 54b) 15-41 (usually 19-21) in the leaf, hairy on both sides, often small, 2-7 mm. long, 1.5-3 mm. broad (3 mm. x 1.5 mm. in the Holotype); style tip as in ssp. *microphylla* or shortly extended and incurved (Fig. 54a); size of the flowers and floral parts as in ssp. *microphylla*.

Subspecies in tomento pilorum erectorum brevium certe in caulibus, interdum in foliolis plusminusve adpressorum; in foliolis utrinque hirtis; in styli apice ut in ssp. *microphylla* vel paulo extenso vel breviter incurvo; et in floribus et floris partibus ut in ssp. *microphylla*, distincta.

Distribution: See Map 19, derived from the Type and the following specimens:—

New South Wales: Walroodah, Barraba, Hay, 9.1903, *719*; Coonamble, per G.V.R.S., 12.9.1939, *720**; Coonabarabran, Jenner, 14.11.1940, *722*; NSW. Darling R., V.E.E., 31.10.1860; Cobar, Lachlan R. (*sic*), Andrae 334, 1887; MEL. Chandos, Nyngan, Parsons, 1921, *725**; Tamworth, Rupp. 11.1904, *726*; "Wongan", Mendooran, Telfer, 6.9.1943, *727*; Warren, Meohr, 28.9.1936, *728*; Co. Livingstone (N. of Menindie), Beadle, 8.1942, *730*; Menindie, Beadle, 11.1939 (*ter*), *721*, *723* and *724*; NSW. Lake Cawndilla, MacGillivray, 2.9.1921; JMB. Darling R., Urquhart, 1889; MEL.

Victoria: Echuca, Herb. Walter, 9.1903; Campaspe, Herb. Mueller, 8.1877; do., Herb. Mueller, 10.1875 (*bis*; dup. NSW. *731*); Campaspe, Berthour 4; MEL.

South Australia: Near Warburton R., ? S.D.E., 24.7.1939; Near Kalamerinna, Camp 40, S.D.E., 27.7.1939; AD. Lower Strzelecki Ck., (Cleland), 19.5.1924; JBC. Tinga-tingana, Strzelecki Ck., S. A. White, 23.9.1916; Caraweena, Strzelecki Ck., (J. M. Black), 21.9.1916; JMB. Near Caraweena, Strzelecki Ck., (Cleland), 31.5.1924; JBC.

f. ssp. **minima** ssp. nov.

Holotype: Banks of the Murray R., at Red Cliffs Pumping Station, NW Victoria, Willis, 18.8.1940; MEL.

Plants with numerous (usually over 30 in the leaf) very small leaflets, 1.5-4 mm. long, 1-3 mm. broad, usually densely pubescent with closely adpressed, fine hairs (Fig. 56). Differs only in the degree of pubescence and size of leaflets from ssp. *microphylla*; from ssp. *tomentosa* it is distinguished by its adpressed pubescence, the density of which distinguishes it also from ssp. *glabrescens*, ssp. *affinis* and ssp. *pallescens*; the style tip is a further distinction from these last three subspecies.

Subspecies in foliolis multis minimis, 1.5-5 mm. longis, 1-3 mm. latis, utrinque plerumque dense pubescentibus pilis brevibus peradpressis, in foliolis pluribus quam 30, et in styli apice ut in ssp. *microphylla*, distincta.

Distribution: See Map 19, derived from the Type and the following specimens:—

New South Wales: Junction of Darling and Murray Rs., Holding, 1887; Mildura, Williamson, 9.1912; MEL. Lake Victoria, No. 37; JMB.

Victoria: Ad fluvium Murray in siccis collibus and 2nd label: Nov. Holl. Austr., ferd. Mueller; Murray's River (*bis*); Murray's R., and 2nd label: Ad flumen Murray, Nov. Holl. Austr., 1847, Stuart and 3rd label: In campis arenosis ad fl. Murray. Oct. 5, 1848, Dr. M.; MEL. R. Murray, Cadell 6, 10.1923; JMB.

South Australia: Barmera, (Cleland), 25.8.1941; Loxton, (Cleland), 21.8.1924; JBC. Loxton, 16.8.1933; Blanchetown, Herb. Tate, 8.1881; Pompoota, R. Murray, Spafford, Dept. Ag. 660, 26.11.1917; AD. In glareoso-arenosis ripis fl. Murray, Murunde versus, Nov. Holl. Austr., lat. febr. 47, ferd. Mueller and 2nd label: Murunde (?Moorundie), 1847; MEL. Montieth, Clarke, *3510*; ADW. South Australia, Blackburn, 1889; BRI. (not mapped).

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*Arbitrarily distinguished from ssp. *minima*.

NEW ZEALAND SPECIES.

Swainsona novae-zealandiae Hook. f., Handbk. N.Z. Fl.:51, 1867.

A single species in New Zealand has been ascribed to the genus *Swainsona* under the above name, and although there is general similarity to the species of that genus in Australia, there is a difference in habit and in the fruit which suggests that the New Zealand species might be better separated generically.

This plant is a small herb or reduced undershrub growing suberect to about 6 or 10 cm. high from a creeping rhizome. In Australian species of *Swainsona* a creeping rhizome has been seen only in a few specimens of *S. brachycarpa* though many species have prostrate stems radiating from a central tap-root. The fruit of the New Zealand plant is subsessile and inflated, with a thinly coriaceous pericarp, the suture not at all intruded, as in *Swainsona lessertiifolia*, but there is a well marked marginal vein in the carpel, running along it on both sides of the suture, which does not occur in any Australian species of *Swainsona*. A further distinction lies in the regularly opposite leaflets of the New Zealand plant.

Leaves are about 2-3 cm. long with 9-21 (usually 15-21) obtuse leaflets, and broadly deltoid stipules pubescent on the outside and 1-2 mm. long. Racemes are short, 1.5-2 cm. long with 2-4 flowers. Flowers are purple (*fide* Hooker), 7-9 mm. long on a slender pedicel of 2-3 mm. in the axil of a narrow bract about as long as the pedicel. The calyx is 5 mm. long, the narrow, acute teeth about as long as the tube, the bracteoles narrow, acute, and also equalling the tube. The standard is ecallose, 7-8 mm. long and broad, the claw 1.5-2 mm. long. Wings are 6.5-7 mm. the claw 2 mm. long and the keel about as long, without pouches or folds. The ovary is hoary, 2-3 mm. long on a short gynophore of 0.5 mm. and almost as thick as the ovary at anthesis. The fruit is about 15 mm. long and 10 mm. in diameter, hoary with scattered, short adpressed hairs.

Only three specimens were available to the writer as a source for this description.

ARTIFICIAL KEY TO THE SPECIES†.

1. Leaves of mature plants with 1 or 3 obtuse leaflets, sparsely pubescent on the lower surface, the style tufted behind the stigma and the tip straight to inflexed, N.T., W.A. ... 41. *S. unifoliolata*.

1*. Leaves of mature plants with more than 3 leaflets (or if three only then the leaflets acute, glabrous or pubescent, and the style tip hooked or geniculate or inflexed without any hairs behind the stigma).

  2. Plants glabrous or at most with a few hairs around the margins or along the midvein of mature leaflets (but not strongly ciliate), inside the calyx teeth, on stipules or ovary, but none on the leaf surfaces (rarely the calyx pubescent outside in *S. brachycarpa*); stipules large or small but not long-decurrent on the stems nor overlapping due to crowding of the leaves. (To p. 262.)

    3. Ovary glabrous (or if sparsely pubescent or pubescent along the suture in very young fruiting stages, then the stipules toothed—*S. laciniata*, or if sparsely woolly-pubescent when young, the ovary stipitate, the fruit glabrous with a ridged, not intruded, suture and the standard with plate-like calli—*S. galegifolia*).

      4. Style with hairs behind the stigma, usually in a small tuft, as well as the usual beard, the style tip straight or slightly inflexed.

        5. Flowers purple, mauve, pink or bluish (rarely white?).

          6. Standard with distinct, plate-like calli.

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† See also Key to the Groups, p. 149.

7. Flowers 15-18 mm. long; fruit 3-5 cm. long, the pericarp membranous; plants rather robust. W.A., S.A. .... 1. *S. colutoides.*

7*. Flowers 6-10 mm. long, fruit 1.5-2.3 cm. long, the pericarp finally firm; plants slender, decumbent. N.S.W., Vic. .... 4. *S. brachycarpa.* ✓

6*. Standard ecallose, flowers 4-8 mm. long, fruit subglobular to ovoid, 5-10 mm. long, 4-5 mm. in diameter, the pericarp firm when mature. N.T., S.A., W.A. ...... 52. *S. microphylla* ssp. *glabrescens* and some ssp. *pallescens.*

5*. Flowers yellow, or sometimes the wings only purple; ovary distinctly stipitate on a short slender stipes at anthesis, elongating in the fruit; suture not intruded in the fruit; see also *S. microphylla* ssp. *pallescens* (under §2*. Plants hoary or pubescent) in which the plants are sometimes almost glabrous, ovary glabrous, and flowers yellow.

8. Leaflets with a very few scattered hairs, or glabrous; calyx very sparsely ciliate, with hairs inside the teeth and sometimes with a few hairs outside; calyx teeth 1 mm. long or shorter, one-fourth of the length of the tube; stipules narrow-deltoid; wings often purple-tipped. N.T. or Q., N.S.W., S.A. .... 7. *S. rigida.*

8*. Plants completely glabrous; calyx teeth equal to the tube, 1.5-2 mm. long; stipules broad, leafy; petals apparently all yellow. Vic., S.A. .. 6. *S. laxa.* ✓

4*. Style without hairs behind the stigma, only the longitudinal beard present.

9. Stipules toothed, broad, pubescent. W.A. .... 18. *S. laciniata.*

9*. Stipules entire, broad or narrow, glabrous or pubescent.

10. Keel twisted sideways; stipules small and often deciduous; leaflets 3-7, glabrous, acute; style tip hooked; ovary on a short stout gynophore but the fruit often tapering into a long stalk-like base. N.T., Q., N.S.W., S.A. .... 33. *S. campylantha.*

10*. Keel straight.

11. Standard with distinct plate-like calli; flowers rather large (12-16 mm. long); style slender, the tip straight; fruit inflated, the pericarp finally firm, the suture not intruded; ovary and fruit distinctly stipitate. Q., N.S.W. .... 2. *S. galegifolia.*

11*. Standard ecallose, or with very small folds or thickenings near the claw; flowers rather small (6-11 mm. long); fruits cylindrical, the suture intruded at maturity; ovary subsessile.

12. Stipules leafy, broad or long.

13. Keel obtuse, deep, 8-9 mm. long; stipules broad; fruit narrow-cylindrical, 20-35 mm. long, 2.5-3 mm. in diameter, the pericarp smooth or nearly so. N.S.W., S.A. .... 15. *S. viridis.*

13*. Keel acute; stipules long and rather broad; fruit reticulate, strongly or only slightly ridged along the veins, 15-30 mm. long, 4-5 mm. in diameter. W.A. .... 17. *S. Kingii.*

12*. Stipules small; fruit known only in immature condition, strongly reticulate, 10-12 mm. long, 2-5 mm. in diameter. S.A. . 16. *S. dictyocarpa.*

3*. Ovary pubescent all over or in part, but not woolly.

14. Stipules distinctly toothed, leafy, at least 3 mm. long and broad.

15. Ovary pubescent all over or only along the suture and parts of the surface, the style slender, its tip straight; flowers 6-7 mm. long, the keel straight. W.A. .... 18. *S. laciniata.*

15*. Ovary pubescent only in small patch at the base of the suture, the style inflexed to hooked at the tip, strongly flattened at the base; flowers very small, 5 mm. long, the keel twisted sideways. W.A. .... 31. *S. gracilis.*

14*. Stipules large or small, all entire.

16. Ovary pubescent all over or at least on a part of the sides.

17. Keel straight; stipules leafy, 5-20 mm. long, and broad at the base; fruit subsessile. W.A. .... 17. *S. Kingii.*

17*. Keel twisted sideways; stipules small, often deciduous; fruit sometimes drawn out into a long stalk-like base. N.T., Q., N.S.W., S.A. .... 33. *S. campylantha.*

16*. Ovary pubescent only along the suture; stipules narrow, 3-8 mm. long, acuminate, glabrous; gynophore elongating slightly (to about 2.5 mm.) but distinctly, in the fruit; fruit (known only in the immature state) inflated, probably smooth-walled at maturity and resembling that of *S. Forrestii* in form. W.A. .... 11. *S. stenodonta.*

2*. Plants hoary or pubescent, sometimes sparsely but always with some hairs on the leaf surface other than on the vein, or if long-ciliate only along the margins and mid-rib, the stipules large (to 3.5 cm. long), strongly decurrent on the stems and often overlapping due to crowding of the leaves.

18. Stipules very large (to 3.5 cm. long), strongly decurrent on the stem, sometimes with a few small teeth, pubescent on the inside or ciliate only; leaflets similarly pubescent on the underside or ciliate only, and the leaves crowded especially near the apex of the stem so that the stipules overlap; flowers 9-11 mm. long, the ovary glabrous or with a line of hairs along the suture only, the style slender with a straight or slightly incurved tip tufted behind the stigma; ovary on a slender stipes 2 mm. long, elongating to about 3 mm. in the fruit. W.A. .. 12. *S. decurrens.*

18*. Stipules usually much smaller and scarcely decurrent on the stem (or if as long in one dimension, the flowers also long, 3-3.5 cm.), toothed or entire, usually pubescent; leaves not crowded so that the stipules overlap.

19. Ovary quite glabrous (*S. stipularis*, under 18*, with brown or purplish flowers and medifixed silky pubescence, has rarely a glabrous ovary).

20. Flowers yellow or sometimes the wings purplish; style with a tuft of short hairs behind the stigma; ovary stipitate, sometimes only shortly at anthesis but distinctly in the fruit; suture not intruded. N.T. or Q., N.S.W., S.A. .... 7. *S. rigida.*

20*. Flowers purple, pink, white or bluish, not yellow except in *S. microphylla* ssp. *pallescens* with subsessile ovary and small, subglobular to ovoid fruit, and rarely in *S. luteola* with incurved to coiled style tip.

21. Flowers 12-20 mm. long, the standard with plate-like calli; plants densely to very sparsely woolly-pubescent, the sparsely pubescent plants with long floral bracts (7-20 mm.) and calyx teeth (to 9 mm.), the densely woolly ones with shorter bracts and calyx teeth; ovary stipitate, the gynophore elongating in the fruit, suture not intruded. N.S.W., Vic., S.A. 3. *S. Greyana* ✓

21*. Flowers less than 12 mm. long, the standard ecallose or with very slight thickenings; pubescence of short, adpressed hairs, or if longer and looser, not fine and woolly.

22. Style tip with a tuft or line of hairs behind the stigma.

23. Style tip strongly incurved to coiled, with a tuft of long hairs behind the stigma. Q., N.S.W. .... 5. *S. Fraseri.*

23*. Style tip straight or inflexed or slightly and minutely incurved with a line of hairs along the terminal inflexed segment, or truncate with a circle of hairs around the capitate stigma (sometimes only a few hairs remaining at the top).

24. Ovary quite glabrous; fruit subglobular to ovoid, 5-10 mm. long, the suture not usually intruded. All States except Tasmania. .... 52. *S. microphylla.* ✓

24*. Ovary sometimes glabrous though usually with a few hairs on the sides near the base; fruit ovoid, 9-13 mm. long, the suture in a broad indentation at maturity. N.S.W. .... 50. *S. monticola.*

22*. Style tip without hairs behind the stigma.

25. Style tip coiled or incurved; standard more or less decumbent along the other petals; racemes insignificant, often shorter than the leaves; ovary and fruit with a smooth surface; often large, radiating, matlike plants. Q., N.S.W. .... 48. *S. luteola.*

25*. Style tip inflexed to slightly reflexed; standard erect behind the other petals; racemes short but usually as long as or longer than the leaves; ovary with a strong undulate surface, the pericarp with reticulating ridges and hollows in the fruit; small prostrate herbs with slender stems. W.A. .... 19. *S. rostellata.*

19*. Ovary hoary or pubescent, all over or in part.

26. Ovary hoary or pubescent all over (*S. stipularis,* in which the ovary has longer, denser hairs in a more or less broad band along the suture while the sides are adpressed-pubescent, hoary or even glabrous, is included here). (To p. 267.)

27. Style with hairs behind the stigma as well as the usual ventral beard.

28. Flowers very small (4-5 mm. long) the wings minute; style tip incurved to coiled with very short hairs behind the stigma; pubescence adpressed; leaves with 9-13 small leaflets, usually 3-4 mm. long. N.S.W., S.A., W.A. .... 47. *S. Oliveri.*

28*. Flowers larger (mostly 7-10 mm. but in *S. parviflora* sometimes only 5 mm. long); style tip various but not incurved to coiled; pubescence adpressed to spreading.

29. Pubescence of short, closely adpressed hairs.

30. Surface of the ovary soon becoming undulate, the pericarp at length strongly honeycombed or undulate-ridged, the fruit strongly curved or straight; leaflets obtuse, 5-15 mm. broad; style tip inflexed or straight with a conspicuous oblique ring or line of hairs behind the stigma. S.A., W.A. .... 42. *S. cyclocarpa.*

30*. Ovary- and fruit-wall smooth, the fruit ovoid to oblong, straight; leaflets acute, often 1 mm. broad, up to 3 mm.; style tip inflexed or almost geniculate, the tuft not very conspicuous. Q., N.S.W. .... 49. *S. parviflora.*

29*. Pubescence of rather long, loosely adpressed to spreading hairs.

31. Hairs medifixed, the pubescence dense, silvery; tuft behind the stigma not conspicuous. S.A. .... 22. *S. tephrotricha.*

31*. Hairs basifixed; tuft behind the stigma often conspicuous as part of an oblique ring around the style tip.

32. Keel very obtuse, the apex (?always) thickened or pouched; standard with a V-shaped thickening or with two thickened lines in the claw diverging upwards; stipules narrow, entire, 3-7 mm. long; petals all purple. W.A. .... 40. *S. Incei.*

32*. Keel obtuse, without any apical thickenings or pouches; standard ecallose or with slightly thickened lines ceasing or diverging shortly above the claw.

33. Style tip geniculate with hairs of the tuft falling along the terminal segment; keel yellow, other petals purple; calyx pubescent chiefly on the veins and margins of the teeth; standard usually with two thickened lines or ridges ceasing or diverging shortly above the claw; stipules entire, 4-7 mm. long, narrow. ?Q., N.S.W., S.A., W.A. .... 43. *S. flavicarinata.*

33*. Style tip straight to inflexed, the hairs of the tuft in a conspicuous oblique ring behind the stigma; all petals purple; calyx more or less uniformly pubescent; standard ecallose; stipules leafy, with a few irregular teeth or undulate, 4-10 mm. long. N.T., S.A. .... 39. *S. villosa.*

27*. Style without any hairs behind the stigma, but only the usual ventral beard, or in *S. plagiotropis* with dorsal beard in the apical one-third or one-half and no ventral beard.

34. Keel spirally coiled or distinctly twisted sideways.

35. Hairs of the pubescence medifixed.

36. Peduncles glabrous or almost so; distal end of the keel usually folded smoothly back in pressed specimens (rarely in some Central Australian localities almost straight); standard with two more or less thickened vertical lines or folds in the claw; style bearded evenly for most of its length, the tip minutely inflexed; hairs of the pubescence usually white. N.S.W., S.A. .... 29. *S. fissimontana.*

36*. Peduncles pubescent, finally sparsely; most of the keel pressed very asymmetrically in herbarium specimens; style bearded chiefly in the upper half, the tip often hooked but various in *S. stipularis;* hairs of the pubescence silky, more or less transparent.

37. Flowers 7-9 mm. long, the calyx with a slight spiral twist at the base, the keel without pouches or with very slight folds; standard ecallose or with two thickened vertical lines or folds in the claw, often very asymmetrical. N.S.W., Vic., S.A. .... 34. *S. Murrayana.* ✓

37*. Flowers often 10-12 (sometimes up to 15) mm. long, the calyx not twisted at the base, the keel with distinct pouches; standard ecallose or with punctate calli. Q., N.S.W. .... 30. *S. stipularis* ssp. *stipularis.*

35*. Hairs of the pubescence basifixed or laterally attached at the base.

38. Style beard dorsal; keel scythe-shaped, subacute; hairs of the pubescence loosely adpressed; standard ecallose or with two slightly thickened vertical lines diverging from the base. Vic. .... 35. *S. plagiotropis.* ✓

38*. Style beard in the usual ventral position; keel attenuate into a narrow, obtuse tip, spirally coiled.

39. Coil of the keel a complete circle, the narrow, pale or yellow tip curved smoothly back on to or past the lower part of the keel (in pressed specimens); pubescence of short, closely adpressed hairs, often very sparse; standard with two distinct, thickened lines diverging above the claw. Q., N.S.W., Vic., S.A., W.A. (See also *S. Drummondii,* W.A.). .... 37. *S. procumbens.* ✓

39*. Coil of the keel incomplete, the tip not yellow and not reaching back on to the keel in pressed specimens, curving around three sides of a square or S-shaped; pubescence of fine, curved, loosely adpressed hairs, moderately dense or quite sparse; standard ecallose. Q., N.S.W., Vic., S.A. (See also *S. Drummondii,* W.A.). 36. *S. swainsonioides.* ✓

34*. Keel straight or somewhat obscurely twisted sideways.

40. Calyx teeth subulate, glabrous except along the veins, 3-5 mm. long, the tube 1.5-2 mm.; hairs attached close to one end. All States except Victoria and Tasmania .... 20. *S. oligophylla.*

40*. Calyx with short to acuminate teeth, the pubescence dense or sparse or absent but not confined to the veins.

41. Hairs of the pubescence medifixed or asymmetrically medifixed (sometimes mixed with basifixed hairs in *S. pedunculata* with the suture intruded in the fruit).

42. Keel with distinct pouches and often with an obscure sideways twist; style flattened towards the base, the tip inflexed, hooked, incurved, geniculate or recurved; hairs of the pubescence medifixed, adpressed, silky or almost transparent, slightly flattened.

43. Flowers often 10-11 mm. long, up to 15 mm., purplish; style tip incurved to recurved, the beard dense near the apex; standard with a pair of vertical folds near the claw diverging shortly upwards. N.S.W., S.A., W.A. .... 30. *S. stipularis* sspp. *purpurea* and *longialata.*

43*. Flowers 4-7 mm. long, pinkish to purple; style tip minutely inflexed; standard ecallose or with two more or less obscure vertical lines in the claw.

44. Flowers very small, 4-5 mm. long. S.A. .... 28. *S. minutiflora.*

44*. Flowers 6-7 mm. long. S.A. .... 27. *S. microcalyx.*

42*. Keel with shallow folds or none, quite straight; style not or scarcely flattened at the base, the tip straight or geniculate; hairs of the pubescence medifixed to subbasifixed (or both basifixed and medifixed hairs on the one plant in *S. pedunculata*), often white or greyish but scarcely silky or transparent unless very fine.

45. Style tip geniculate; flowers 7-9 mm. long, the standard ecallose, or with more or less poorly developed small vertical thickenings; hairs of the pubescence variously sparse to dense and silvery, and medifixed to subbasifixed; keel obtuse with or without shallow folds near the auricle. N.S.W., Vic., S.A. .... 25. *S. oroboides* ssp. *sericea.* ✓

45*. Style slender with a straight tip.

46. Keel obtuse with a pair of shallow folds, glabrous; standard with plate-like calli; hairs of the pubescence medifixed, often dense, those on the peduncle often basifixed; flowers about 10-15 mm. long. All States except Tasmania. .... 14. *S. phacoides* ssp. *phacoides.* ✓

46*. Keel acute with at least a few hairs on the sides; standard without true plate-like calli though sometimes with a pair of vertical thickened ridges resembling them, or confluent above the claw, or with more or less confluent punctate calli, broad and high behind the other petals making the flower higher (15 mm.) than long (11-12 mm.); hairs of the pubescence basifixed to asymmetrically medifixed. W.A. .... 13. *S. pedunculata.*

41*. Hairs of the pubescence basifixed or laterally attached at the base, or if asymmetrically medifixed then the fruit with a ridged, not intruded, suture (some *S. lessertiifolia*).

47. Keel 25-30 mm. long, the standard of equal length or up to 35 mm. W.A. .... 8. *S. Maccullochiana.*

47*. Keel up to 20 mm. long, usually less than 15 mm. except in *S. ecallosa.*

48. Style tip incurved to coiled; stipules entire.

49. Flowers 6-8 mm. long, the standard more or less decumbent on the other petals, the raceme inconspicuous and often shorter than the leaves; wings very small, 4-5.5 mm. long, distinctly shorter than the keel; style tip usually coiled, more rarely incurved; pubescence adpressed to loose, usually not dense. Q., N.S.W. .... 48. *S. luteola.*

49*. Flowers 7-9 mm. long, the standard erect behind the other petals; pubescence dense and velvety or rather dense and softly spreading; racemes distinctly exceeding the leaves.

50. Leaflets numerous in the leaf (up to 31), at first tomentose on both sides; standard with an inverted V-shaped thickening, or small vertical calli; fruit 7-8 mm. long, densely tomentose; plants densely and shortly tomentose. N.S.W., S.A. ...... 45. *S. Burkittii.*

50*. Leaflets 7-15 in the leaf; fruit 10-12 mm. long, densely short-tomentose or more sparsely pubescent with longer, loosely spreading hairs.

51. Flowers 20-35 crowded in the raceme; leaflets densely short-tomentose at least on the lower surface; keel thickened or slightly puckered near the apex. N.T., S.A., W.A. 46. *S. canescens.*

51*. Flowers 4-8, rarely up to 15, in the raceme; leaflets more or less densely pubescent with long, loosely adpressed to spreading hairs on the underside, usually glabrous above; keel acute or obtuse, not thickened apically but when not acute the apex sometimes slightly fanned out. N.T., S.A. .... 44. *S. Burkei.*

48*. Style tip straight, geniculate or inflexed, or if slightly incurved, the stipules toothed.

52. Standard with distinct plate-like calli or with a V- or Y-shaped thickening.

53. Pubescence adpressed or if slightly spreading, the hairs stiff; calli plate-like; stipules rather narrow, entire. W.A. .... 14. *S. phacoides* ssp. *grandiflora.*

53*. Pubescence of fine, softly spreading hairs; standard with a V-shaped thickening; stipules broad with a few irregular teeth. W.A. .... 24. *S. Beasleyana* ssp. *elegantoides.*

52*. Standard ecallose, or with small vertical or inconspicuous thickenings.

54. Style tip straight to inflexed.

55. Keel with hairs on the sides, acute to rostrate; flowers 10-12 mm. long, only 1-3 in the raceme; standard with two short vertical or punctate thickenings, sometimes confluent, above a short claw; leaves with 3-7 (usually 5) leaflets. W.A. .... 13. *S. pedunculata.*

55*. Keel without hairs on the sides, subacute to obtuse; standard ecallose or with small vertical thickenings only; leaves with 13 or more leaflets.

56. Ovary subsessile on a rather stout gynophore 1 mm. long or shorter; calyx usually dark-haired.

57. Leaves with 13-19 leaflets, the leaflets usually obtuse or emarginate, 2-9 (usually 4-7) mm. broad, 5-20 (usually 9-18) mm. long; raceme usually with 10-20 flowers; style tip straight or minutely inflexed; standard ecallose; keel with or without a pair of shallow folds near the auricles; fruit inflated with a firm pericarp, the suture not intruded. Vic., Tas., S.A. (N.S.W.?) .... 21. *S. lessertiifolia.* ✓

57*. Leaves with 5-9 leaflets, the leaflets 1-2 mm. broad; raceme usually with 10 flowers or fewer; style tip inflexed, rarely almost geniculate to recurved; standard ecallose or with small vertical calli or with slightly thickened lines in the claw, and sometimes with a few hairs on the back near the claw; keel with deep folds or pouches near the auricles; fruit cylindrical with a deeply intruded suture. S.A. W.A. ....26. *S. campestris.*

56*. Ovary distinctly but sometimes shortly stipitate on a slender gynophore 2-5 mm. long; calyx usually with white or pale hairs.

58. Keel 18-20 mm. long, the claw 8-10 mm.; fruit about 16 mm. long, the stipes at least 5 mm. long at maturity; style tip with a weak, perhaps transient, hair tuft behind the stigma. W.A. .. 9. *S. ecallosa.*

58*. Keel 9-10 mm. long, the claw 2.5-5 mm.; fruit 7-10 mm. long, the stipes at least 3 mm. at maturity; style tip not tufted. W.A. .... 10. *S. Forrestii.*

54*. Style tip geniculate; standard glabrous, often with small vertical calli; keel obtuse, without hairs on the sides, with or without a pair of shallow folds near the auricles; calyx usually with light-coloured or mixed light and dark hairs except in ssp. *hirsuta;* flowers 7-10 mm. long, 3-7 or rarely as many as 10 in a raceme or umbel. All States except Tasmania .... 25. *S. oroboides* except ssp. *sericea.* ✓

26*. Ovary pubescent along the suture only (see also *S. stipularis* with medifixed hairs and often twisted keel in which the ovary sometimes conforms to this description), or on part of the sides only.

59. Ovary pubescent all along the suture (or in *S. recta* sometimes only near its base), but not on the sides; keel straight.

60. Stipules narrow, entire; flowers small, 5-8 mm. long.

61. Style with short hairs behind the stigma, the tip inflexed; standard erect behind the other petals; ovary sometimes pubescent only towards the base of the suture; plants with slender, but rather rigid suberect stems and conspicuous racemes exceeding the leaves; fruits 7-11 mm. long. N.S.W., Vic. .... 51. *S. recta.* ✓

61*. Style without hairs behind the stigma, the tip strongly incurved to coiled; standard more or less decumbent on the other petals; plants prostrate, mat-like, the larger ones with rather stout stems, the racemes inconspicuous, often shorter than the leaves; fruits 20-35 mm. long. Q., N.S.W. .... 48. *S. luteola.*

60*. Stipules broad, toothed; flowers larger, 8-16 mm. long.

62. Standard with distinct, horizontal calli; flowers 15-16 mm. long. W.A. 24. *S. Beasleyana* ssp. *Beasleyana.*

62*. Standard with a V-shaped thickening; flowers 8-12 mm. long. W.A. .. 23. *S. elegans.*

59*. Ovary pubescent only on small areas near the base; keel straight or twisted sideways (see also *S. recta* which usually has hairs all along the suture but sometimes only near its base).

63. Keel twisted sideways, acute or narrowly obtuse to rostrate; stipules toothed or undulate, broad; style tip hooked without hairs behind the stigma; ovary pubescent on a small patch or short line at the base of the suture; fruit (where known) strongly reticulate.

64. Flowers 9-11 mm. long. W.A. .... 32. *S. occidentalis.*

64*. Flowers 5 mm. long. W.A. .... 31. *S. gracilis.*

63*. Keel straight, narrowly obtuse; stipules entire; style tip straight to inflexed or minutely incurved with short hairs behind the stigma; ovary pubescent in small patches on the sides near the base, or glabrous; pericarp smooth; plants laxly ascending or decumbent. N.S.W. .... 50. *S. monticola.*

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List of the Naturalised Grasses in New South Wales.

D. O. Cross, B.Sc.Agr., and Joyce W. Vickery, M.Sc.

INTRODUCTION.

This list is intended as a supplement to the list of "The Naturalised Flora of New South Wales" by R. H. Anderson, published in vol. I No. 1 of the Contributions from the National Herbarium of New South Wales.

It includes all those grasses known to be naturalised in this State, but excludes those known only in cultivation. Many grasses have been introduced by the Department of Agriculture, and grown on experiment farms, or on the farms and pastures of interested farmers and graziers. Unless there is evidence that such species have spread away from the areas of planting in open competition with other members of the native or naturalised flora, they have not been included.

Species marked with an asterisk are those which have been included by some authors with the native flora. There is reason to suspect, however, that they may have been introduced with the early settlers, and have spread widely before sufficient botanical observations had been taken to enable their origin to be determined with certainty. Such species are generally of a vigorous nature, and have now become more or less cosmopolitan in distribution.

LIST OF SPECIES.

- Agropyron J. Gaertn.
  - repens (L.) Beauv., Quack Grass or English Couch Grass.—Temperate regions.
- Agrostis L., Bent Grasses.
  - gigantea Roth, Red Top Bent.—Europe, Asia, North America.
  - semiverticillata (Forssk.) Christens.—Southern Europe, Asia.
  - stolonifera L., Creeping Bent.—Europe, Asia, North America.
  - tenuis Sibth., Brown Top Bent.—Europe, Asia, North America.
- Aira L.
  - elegans Willd. ex Gaud. (*A. capillaris* Host, 1809, non Lag., 1805). Silvery Hair Grass.—Europe.
  - caryophyllea L., Silvery Hair Grass.—Europe.
  - Cupaniana Guss. Silvery Hair Grass.—Mediterranean Region.
  - praecox L., Early Hair Grass.—Europe, Asia.
  - provincialis Jord.—Europe.
- Alopecurus L.
  - myosuroides Huds. (*A. agrestis* L.), Slender Fox-tail.—North Temperate Europe and Asia.
  - geniculatus L., Knee-jointed Fox-tail.—Temperate regions.
  - pratensis L., Meadow Fox-tail.—Europe.
- Ammophila Host.
  - arenaria (L.) Link, (*A. arundinacea* Host), Marram Grass.—Europe.
- Andropogon L.
  - virginicus L., Broomsedge.—North America.

Anthoxanthum L.
    odoratum L., Sweet Vernal Grass.—Europe, Temperate Asia.

Arrhenatherum Beauv.
    elatius (L.) J. et C. Presl, False Oat.—Europe.
    elatius var. bulbosum (Willd.) Spenner, Bulbous Oat Grass.—Europe.

Avena L.
    barbata Brot., Bearded Oat.—Mediterranean region.
    byzantina C. Koch, Oat.—Europe.
    fatua L., Black Oat.—Europe.
    sativa L., Oat.—Commonly cultivated over a large part of the globe; probably originated in Europe.
    sterilis L., Sterile Oat.—Europe.

Axonopus Beauv.
    affinis A. Chase, Narrow-leafed Carpet Grass.—North America.
    *compressus (Swartz) Beauv., Broad-leafed Carpet Grass.—West Indies.

Brachiaria (Trin.) Gris.
    mutica (Forsk.) Stapf, (*Panicum barbinode* Trin.), Para Grass.—Africa.

Briza L.
    maxima L., Large Quaking Grass.—Mediterranean region.
    minor L., Small Quaking Grass.—Europe, Asia.
    triloba Nees in Mart.—South America.

Bromus L.
    (See also the genera *Ceratochloa* and *Serrafalcus*.)
    Gussonii Parl., (*B. maximus* Auct. Austr. non Desf. non Gileb.), Giant Brome.—Europe, Temperate Asia.
    madritensis L., Madrid Brome Grass.—Mediterranean region.
    rubens L., Red Brome Grass.—Mediterranean region.
    sterilis L., Sterile Brome Grass.—Europe, Temperate Asia.
    tectorum L., Downy Brome.—Europe, Asia.

Cenchrus L.
    pauciflorus Benth., Spiny Burr Grass.—North America.

Ceratochloa Beauv.
    brevis Nees ex Steud., (*Bromus brevis* Steud.).—South America. Possibly only a form of C. unioloides.
    unioloides (H.B.K.) Beauv., (*Bromus unioloides* H.B.K.), Prairie Grass.—America.

Chloris Swartz.
    Gayana Kunth, Rhodes Grass.—South Africa.
    virgata Swartz, Feather-top Chloris.—Tropical America.

Cortaderia Stapf.
    selloana (Schult.) Aschers. et. Graebn., (*Gynerium argenteum* Nees), Pampas Grass.—South America.

Cynodon Rich.
    *Dactylon (L.) Pers., Couch Grass.—Warm regions of both hemispheres, almost cosmopolitan, and possibly native to Australia.
    incompletus Nees, Blue Couch.—South Africa.

Cynosurus L.
    cristatus L., Crested Dogs-tail.—Europe, North-west Asia.
    echinatus L., Rough Dogs-tail.—Southern Europe.

Dactylis L.
glomerata L., Cocks-foot Grass.—Europe.

Deschampsia Beauv.
*caespitosa (L.) Beauv., Tufted Hair Grass.—Europe, Asia.

Digitaria Heist.
adscendens Henrard, (*D. marginata* Link), Summer Grass.—Almost cosmopolitan.
aequiglumis (Hack. et Arech.) Parodi.—South America.
debilis (Desf.) Willd.—Mediterranean region, Tropical Africa.
*didactyla Willd., False Blue Couch.—Mascarenes, Madagascar, Tonkin, Australia.
horizontalis Willd.—Tropical regions of both hemispheres.
ischaemum (Schreb.) Muhl., Smooth Crabgrass.—Europe, Asia.
*sanguinalis (L.) Scop., (*Panicum sanguinale* L.), Summer Grass.—Almost cosmopolitan.
ternata (Hochstetter) Stapf.—Africa, India, Burma, Yunnan.
violascens Link.—Tropical America and Asia.

Echinochloa Beauv.
*colonum (L.) Link, (*Panicum colonum* L.), Awnless Barnyard Grass.—Tropical regions of both hemispheres.
*crusgalli (L.) Beauv., (*Panicum crusgalli* L.), Barnyard Grass.—Almost cosmopolitan.

Ehrharta Thunb. Veldt Grasses.
calycina Sm., Perennial Veldt Grass.—South Africa.
erecta Lam., (*E. panicea* Sm.).—South Africa.
longiflora Sm., Veldt Grass.—South Africa.
villosa Schult., Pyp Grass.—South Africa.

Eleusine Gaertn.
*indica (L.) Gaertn., Crows-foot Grass.—Cosmopolitan in Tropics and Subtropics.
tristachya (Lam.) Lam.—Tropical Africa.

Eragrostis Host. Love Grasses.
Barrelieri Daveau.—Southern Europe.
chloromelas Steud.—South Africa.
cilianensis (All.) Lutati, (*E. major* Host), Stink Grass.—Mediterranean region.
curvula (Schrad.) Nees var. valida Stapf, African Love Grass.—South Africa.
mexicana (Hornem.) Link, Mexican Love Grass.—North and Central America.
neomexicana Vasey.—North America.
pilosa (L.) Beauv., Soft Love Grass.—Europe.
poaeoides Beauv., Smaller Stink Grass.—Europe.
tephrosanthos Schult.—America.
A few other species of *Eragrostis* are naturalised here whose identity it has not yet been possible to determine.

Festuca L. (see also the genera *Scleropoa* and *Vulpia*).
arundinacea Schreb., Giant Fescue.—Europe.
elatior L., Tall Fescue.—Europe, Asia.
rubra L., Red Fescue.—Europe.

Gastridium Beauv.
ventricosum (Gouan) Schinz et Thell., Nit Grass.—Europe.

Glyceria R. Br.
    maxima (Hartm.) Holmb. (*G. aquatica* (L.) Wahlberg, non *G. aquatica* (L.) Presl), Water Meadow Grass.—North temperate regions.

Holcus L.
    lanatus L., Yorkshire Fog.—Europe, Temperate Asia.

Hordeum L. Barley Grasses.
    leporinum Link, (*H. murinum* var. *leporinum* Richt; widely known here as *H. murinum*), Barley Grass.—Europe, Asia, North Africa.
    Hystrix Roth; widely known here under the name of *H. marinum* Huds., (*H. maritimum* With.), which is a closely allied species.—Europe.
    vulgare L., Barley.—Europe, Asia.

Koeleria Pers.
    phleoides (Vill.) Pers., Annual Cats-tail.—Mediterranean region.

Lagurus L.
    ovatus L., Hare's-tail Grass.—Mediterranean Coasts.

Lamarckia Moench.
    aurea (L.) Moench., Golden Top.—Mediterranean region.

Lolium L. Rye Grasses.
    multiflorum Lam., Italian Rye Grass.—Europe.
    perenne, L., Perennial Rye Grass.—Europe.
    loliaceum (Bory et Chaub.) Hand-Maz., Rigid Rye Grass.—Europe.
    rigidum Gaud., Wimmera Rye Grass.—Europe.
    temulentum L., Darnel.—Europe, Temperate Asia.

Microstegium Nees.
    nudum (Trin.) A. Camus, (*Pollinia nuda* Trin.).—South Africa, India, China, Japan.

Miscanthus Anderss.
    sinensis Anderss., Eulalia.—Eastern Asia.

Molineria Parl.
    minuta (Loefl.) Parl., (*Aira minuta* Parl.).—Europe, Asia.

Nassella Desv.
    trichotoma Hackel, Yass River Tussock.—South America.

Oryzopsis Michx.
    miliacea (L.) Benth. et Hook. f. ex Aschers. et Schweinf., Rice Millet.—Mediterranean region.

Monerma Beauv.
    cylindrica (Willd.) Coss. (*Lepturus cylindricus* (Willd.) Trin.), Common Barb Grass.—Mediterranean region.

Panicum L. (See also the genera *Brachiaria, Digitaria, Echinochloa.*)
    antidotale Retz., Giant Panic.—India.
    bulbosum H.B.K., Texas Grass.—Mexico.
    capillare L., Witchgrass Panic.—North America.
    coloratum L., Coolah Grass (has been incorrectly known here as *P. prolutum*).—Africa.
    laevifolium Hack., Sweet Grass.—Africa.
    maximum Jacq., Guinea Grass.—Africa.
    miliaceum L., Millet Panic.—Europe, Asia.
    *paludosum Roxb., Swamp Panic.—Tropical Asia.
    texanum Buckl., Texas Millet.—North and Central America.

- Parapholis C. E. Hubbard.
  - incurva (L.) C. E. Hubbard, (*Lepturus incurvatus* (L.) Trin.; *Pholiurus incurvus* (L.) Schinz et Thellung), Coast Barb Grass.—Mediterranean region.
  - filiformis (Roth) C. E. Hubbard, (*Pholiurus filiformis* (Roth) Schinz et Thellung).—Europe.
- Paspalum L. (See also the genus *Axonopus*.)
  - ciliatifolium Michx., One-spiked Paspalum.—North America, West Indies.
  - conjugatum Bergius, Hilo Grass.—Tropical America and Indo-Malaya.
  - dilatatum Poir., Paspalum.—South America.
  - paniculatum L., Russell River Grass.—Tropical America.
  - Urvillei Steud., Vasey Grass.—South America.
- Pennisetum L. Rich.
  - clandestinum Hochst. ex. Chiov., Kikuyu Grass.—Abyssinia.
  - macrourum Trin., African Feather Grass.—South Africa.
  - villosum R. Br., Feathertop.—Abyssinia.
- Pentaschistis Stapf.
  - airoides (Nees) Stapf.—South Africa.
- Phalaris L.
  - arundinacea L., Reed Canary Grass.—Europe, Asia.
  - canariensis L., Canary Grass.—Mediterranean region.
  - Lemmoni Vasey.—North America.
  - minor Retz., Lesser Canary Grass.—Mediterranean region.
  - paradoxa L., Paradoxical Canary Grass.—Mediterranean region.
  - tuberosa L. var. stenoptera Hitchc., Toowoomba Canary Grass.—Mediterranean region. Toowoomba Canary Grass is a form of this species which appeared in Queensland, origin unknown.
- Phleum L.
  - pratense L., Timothy.—Temperate Europe, Asia.
- Poa L.
  - annua L., Winter Grass.—Europe; now almost cosmopolitan.
  - arachnifera Torr., Texas Blue Grass.—North America.
  - bulbosa L., Bulbous Blue Grass.—Europe.
  - compressa L., Canadian Blue Grass.—Europe.
  - pratensis L., Kentucky Blue Grass.—Europe, Asia.
- Pollinia Trin.
  - imberbis Nees ex Steud.—Western India, Japan.
- Polypogon Desf.
  - monspeliensis (L.) Desf., Beard Grass.—Europe, Asia.
- Psilurus Trin.
  - incurvus (Gouan) Schinz et Thellung, (*P. aristatus* (L.) Duval-Jouve).—Mediterranean region.
- Rhynchelytrum Nees.
  - repens (Willd.) Hubbard, (*Tricholaena rosea* Nees), Red Natal Grass.—South Africa.
- Schismus Beauv.
  - barbatus (L.) Thell., Mediterranean Grass, Arabian Grass or Kelch Grass.—Mediterranean region.
- Scleropoa Griseb.
  - rigida (L.) Griseb., Rigid Fescue.—Europe, Western Asia.
- Secale L.
  - cereale L., Rye.—Largely cultivated in Europe as a cereal.

Serrafalcus Parl.
alopecuroides (Poir.) Parl., Curly Brome Grass.—Mediterranean region.
mollis (L.) Parl., (*Bromus mollis* L.), Soft Brome Grass.—Europe, Western Asia.
molliformis Husnot (*Bromus molliformis* Lloyd), Soft Brome Grass.—Europe.
racemosus (L.) Parl., (*Bromus racemosus* L.), Smooth Brome Grass.—Europe.
secalinus (L.) Bab., (*Bromus secalinus* L.), Rye Brome Grass.—Europe.

Setaria Beauv.
geniculata (Lam.) Beauv. var pauciseta Desv., Slender Pigeon Grass.—America.
glauca (L.) Beauv., Pale Pigeon Grass.—Europe, Temperate Asia.
italica (L.) Beauv., Italian Millet.—Europe, Asia.
pallide-fusca (Schum.) Stapf et Hubbard.—Africa.
palmifolia (Willd.) Stapf, (*Panicum plicatum* Willd.), Palm Grass.—India.
verticillata (L.) Beauv., Bristle Pigeon Grass.—Europe, Tropical America.
viridis (L.) Beauv., Green Pigeon Grass.—Europe.

Sorghum Moench.
*halepense (L.) Pers., Johnson Grass.—Mediterranean region.

Sporobolus R. Br.
capensis Kunth (also at one time erroneously known here as *S. indicus* and *S. Berteroanus*), Parramatta Grass.—South Africa.

Stenotaphrum Trin.
secundatum (Walt.) Kuntze, (*S. americanum* Schrank), Buffalo Grass.—Warm parts of America, Africa.

Stipa L.
Neesiana Trin. et Rupr.—South America.

Trisetum, Pers.
pumilum Kunth.—Mediterranean region.

Triticum L.
aestivum L., Wheat.—Origin unknown, but cultivation extending over several thousand years.

Vulpia Gmel.
bromoides (L.) S. F. Gray, (*Festuca bromoides* L.), Brome Fescue.—Probably originated in Europe, now almost cosmopolitan.
megalura (Nutt.) Rydb., Fox-tail Fescue.—America.
Myuros (L.) Gmel. (*Festuca Myuros* L.), Rats-tail Fescue.—Probably originated in Europe, now almost cosmopolitan.

Urochloa Beauv.
panicoides Beauv., Urochloa Grass, Liverseed Grass.—India.

The Species of *Amphipogon* R.Br. (Gramineae).

Joyce W. Vickery, M.Sc.

INTRODUCTION.

It has been evident to the writer for a long time that the collection of *Amphipogon* in the National Herbarium, Sydney, required detailed revision. Since the description of the genus and five species by Robert Brown in 1810 (Prod., p. 175), and the enumeration of the species by Bentham in the Flora Australiensis (1878, p. 597), references to the genus in literature have generally been fragmentary in character, embodying records of collections or descriptions of an occasional new species. The time seemed opportune for an attempt to co-ordinate the literature, and revise the concept of some species in the light of a study of the more numerous specimens now located in the various Australian State Herbaria, which were not available to the earlier workers.

Type specimens, Duplicate Types or fragments from the Type of each species and variety have been examined, except in the case of *Amphipogon restionaceus, A. strictus* var. *occidentalis, A. elatior* and *Gamelythrum denudatum.* The description of the first-named is accompanied by an excellent figure which establishes its identity; the last-named was described from material with abortive spikelets. The identity of the other two is also scarcely in doubt.

The genus *Amphipogon* is endemic to Australia, where it occurs on the mainland in all the States, but is not found in Tasmania. Probably the most abundant and widespread species is *A. caricinus* F. Muell., which occurs in grasslands of the lower rainfall areas throughout the continent. *A. strictus* R.Br., in one or other of its varietal forms is also widespread, but appears to be restricted to coastal or tableland districts, usually on barren soils or in exposed situations. The remaining species appear to be more restricted in distribution, occurring chiefly in the south-west of Australia, where speciation appears to have been most pronounced.

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Abbreviations.

In the citation of specimens of each species, the following abbreviations have been used to indicate the Herbaria in which each specimen is located: (ADW.) Waite Agricultural Research Institute, Adelaide; (BM.) British Museum of Natural

History; (BRI.) Botanical Museum and Herbarium, Brisbane; (CAN.) Herbarium of the Council for Scientific and Industrial Research, Canberra; (CGE.) Botanical Museum and Herbarium of the Botany School, Cambridge University; (G.) Institute de Botanique Systematique, Geneva; (K.) Royal Botanic Gardens, Kew, England; (MEL.) National Herbarium, Melbourne; (PERTH.) Herbarium of the Department of Agriculture, Perth; (NSW.) National Herbarium of New South Wales, Sydney; (SYD.) Department of Botany, University of Sydney; (STB.) Herbarium of S. T. Blake, Brisbane.

GENERIC DESCRIPTION.

Amphipogon R.Br., Prod., (1810), 175.

Inflorescence contracted into a dense head or short, cylindrical, spike-like panicle. Rhachis of the spikelet articulate above the glumes, not continued beyond the floret. Spikelets 1-flowered, hermaphrodite, the lower spikelets sometimes sterile. Glumes 2, persistent, membranous or chartaceous, 3-nerved, the nerves more or less dorsally placed, acute to rather obtuse or tapering into an awn-like point, rarely 3-fid, often sub-equal. Callus short and obtuse or long and stipitate. Lemma closed around the flower, deeply 3-cleft with each segment usually awned, somewhat indurated at maturity. Palea usually almost as long as the lemma, deeply divided into 2 narrow, rigid lobes or awns similar to those of the lemma. Stamens 3. Styles united at the base, free upwards. Grain enclosed in the somewhat hardened lemma and palea. Mostly perennial grasses, the leaves usually convolute-terete or subulate. Rhizome sometimes creeping but more or less contracted, sometimes the plant caespitose.

KEY TO THE SPECIES AND VARIETIES.

1. Glumes always distinctly 3-lobed. Panicles oblong. Lemma scabrous but not hirsute.

2. Spikelets and lemma about 8 mm. long. Panicles about 1 cm. long. Plant slender, decumbent, geniculate at the nodes .... *A. debilis.* 1.

2*. Spikelets and lemmas 9-10 mm. long. Panicles usually 1.5-2 cm. long. Plant usually more erect and rigid .... *A. debilis var. fallax.* 1a.

1*. Glumes entire, though sometimes irregularly torn at the apex at maturity.

3. Callus 1.5-4 mm. long, acute or acuminate.

4. Panicle oblong-cylindrical, about 4 cm. x 1 cm. Lemma 11-12 mm. long, including the 1.5-2.5 acute callus and the bristles, the callus and body covered with rather short stiff erect hairs. Glumes glabrous .. *A. avenaceus.* 2.

4*. Panicle obovoid-turbinate. Lemma about 16 mm. long including the 1.5-4 mm. acuminate callus and the scabrous bristles, the body covered with silky appressed hairs. Glumes hirsute above with spreading hairs .... *A. turbinatus.* 3.

3*. Callus less than 1.5 mm. long, more or less obtuse. Panicles ovoid-globular to cylindrical.

5. Lemma with 3 acuminate, scabrous lobes, not or scarcely awned, the body appressed-silky-hairy. Panicles ovoid-globular .... *A. amphipogonoides.* 4.

5*. Lobes of the lemma produced into bristles.

6. Glumes narrow-lanceolate, tapering into fine points, more or less densely hirsute with tubercle-based hairs. Panicle ovoid-globular. Lemma silky-pubescent between the nerves in the lower part .... *A. laguroides.* 5.

6*. Glumes broadly ovate, obtuse or narrowed into short acute tips. Panicles ovoid, oblong or cylindrical.

7. Lemma uniformly covered with short, appressed, silky hairs on the dorsal region below the lobes, glabrous towards the margins.
    8. Bristles conspicuously ciliate to the tips, the cilia sometimes becoming lost with age .... *A. caricinus* var. *sericeus.* 6a.
    8*. Bristles scabrous, not or scarcely ciliate at any time, the evanescent membranous lobes slightly ciliate at the tips .... *A. caricinus* var. *scaber.* 6b.

7*. Lemma with 2 vertical bands of appressed silky hairs on the back in the lower part.
    9. Plant caespitose or with a very short, erect or oblique rhizome. Panicle cylindrical, narrow. Bristles ciliate to the tips ...... *A. caricinus.* 6.
    9*. Culms arising from a rather contracted, horizontal rhizome. Panicle oblong to ovate-oblong. Bristles with cilia diminishing in length towards the scabrous tips.
        10. Glumes more or less distantly scabrous-pubescent with few or no scattered cilia on the back in the upper part. Blades seldom exceeding 5 cm. in length, glabrous to hirsute. Lemma 9-10 mm. long .... *A. strictus.* 7.
        10*. Glumes pubescent, and ciliate with numerous rigid hairs on the margins and back.
            11. Lemma 10-12 mm. long.
                12. Lobes of the lemma more than twice as long as the body. Blades more or less glabrous, rarely exceeding 8 cm., usually less .... *A. strictus* var. *setifer.* 7a.
                12*. Lobes of the lemma about twice as long as the body. Blades conspicuously hirsute, slender, up to 15 cm. long .... *A. strictus* var. *hirsutus* 7b.
            11*. Lemma about 8-9 mm. long, the lobes about twice as long as the body. Leaves often hirsute, slender, rarely exceeding 10 cm. in length .... *A. strictus* var. *brevisetus.* 7c.

ENUMERATION OF THE SPECIES AND VARIETIES.

1. A. debilis R.Br., Prod., (1810), 175; Kunth, Enum., I (1833), 253; Benth., Fl. Austral., VII (1878), 597.

TYPIFICATION: Western Australia, King George's Sound, R. Brown, Iter Australiense 1802-5, No. 6228, HOLOTYPE (BM.; duplicate at K.).

SYNONYMS: *Aegopogon debilis* (R.Br.) Beauv., Agrost., (1812), 122; *Amphipogon debilis* var. *typica* Domin in Jour. Linn. Soc., Bot., XLI (1912), 275 in observations; *Amphipogon Brownii* F. Muell., Fragm., VIII (1874), 201 in part.

Ascending on somewhat decumbent, slender perennial, very geniculate at the lower nodes, often about 20 cm. high. Culms very fine, filiform above, minutely mottled-purple, smooth, glabrous except for a slight scabrous-pubescence below the node and a ring of somewhat ephemeral short hairs adjacent to the node, about 3-5-noded, the nodes otherwise glabrous and of smaller diameter than the internodes. Sheaths mostly glabrous, ribbed, enclosing the culms, shorter than the internodes, smooth or microscaberulous. Ligule ciliate, the cilia about 0.5-1 mm. long. Blades 1-12 cm. long, finely inrolled-setaceous to sub-filiform, rather stiff, smooth to microscaberulous on the outer surface. Panicle about 1 cm. long, oblong, spike-like, compact, much exserted, the peduncle just below the spikelets and the rhachis slightly scabrous-pubescent. Spikelets pale, 7-8 mm. long. Glumes unequal, the lower about 4.5 mm. long, the upper about 3.5 mm. long, each 3-lobed with the central lobes firm, 3-nerved, the lateral lobes and margins of the glumes sub-hyaline; central lobe of the lower glume exceeding the laterals by about 0.75 mm., scabrous above; central lobe of the upper glume slightly exceeding the laterals; margins of all the lobes ciliolate. Lemma 7-8 mm. long by 1 mm. wide when folded, linear, firm, sub-cartilaginous, finely scabrous, the nerves obscure, 3-lobed from below the middle, the lobes narrowing into short, scabrous, awn-like points, the lobes erect, rigid, the margins of the central lobe and inner margins of the lateral lobes thickened, the lateral lobes with very narrow obscure, membranous outer margins. Callus very short, obtuse, bearing a ring of erect cilia about 0.75 mm. long. Palea very narrow, slightly shorter than the lemma, scaberulous, of similar texture to that of the lemma, 2-lobed for two-thirds of its length, the lobes narrowed into short awns, the awns scabrous, the outer margins of the lobes and of the palea hyaline and easily separable. Lodicules spathulate to broad-oblong, about 0.4 mm. long.

LOCALITIES: *Western Australia*: King George's Sound, R. Brown No. 6228, 1802-5 (BM.; K.); King George's Sound, F. Mueller, 24.12.1877 (MEL.; K.); King George's Sound, Baxter (K.); Swan River, Drummond No. 117 (K.).

1a. var. **fallax** Domin in Jour. Linn. Soc., Bot., XLI (1912), 275.

TYPIFICATION: Western Australia, Oulina, Max Koch No. 1828, 11.1907, HOLOTYPE NUMBER (K.; NSW. No. 1926).

Culms usually more erect and rigid in habit, often 25-35 cm. high, though sometimes fine and geniculate at the nodes as in the species; scales at the base of the culms sometimes ciliate in the lower part. Panicles mostly 1.5-2 cm. long. Spikelets 9-10 mm. long. Glumes rather firmer in texture, the lower 5.5-7 mm. long and scabrous on the back, with the lateral lobes equal to or up to 2 mm. shorter than the central lobe; upper glume 4.5-6 mm. long. Lemma 9-10 mm. long, about 1.25 mm. broad.

LOCALITIES: *Western Australia*: Oulina, Max Koch No. 1828, 11.1907 (NSW. No. 1926); Wooroloo and Oulina, Max Koch No. 1828, 12.1907 (NSW. No. 1925); Harvey, F. Stoward, 11.1911 (NSW. No. 1928); Mundaring, C. B. Palmer, 1930 (K.); Midland Junction, ex herb. W. V. Fitzgerald, 12.1899 (NSW. No. 1929); between Swan View, Darling Range and Midland Junction, ex herb. A. Morrison, 5.12.1903 (K.); Kelmscott, ex herb. A. Morrison, 14.12.1900 (K.); Canning Plains, ex herb. W. V. Fitzgerald, 1.1903 (NSW. No. 1927); Flats, SE of Cannington, Canning River, A. Morrison, 29.11.1899 (K.); Cannington, Canning River, A. Morrison, 19.12.1903 and 25.11.1905 (K.); C. A. Gardner (PERTH); Blackwood, stony places, Oldfield No. 658 (PERTH); Mt. Clarence, J. Staer, 2.1911 (NSW. No. 1924); Mt. Clarence, Albany, Cecil Andrews, 5.12.1902 (PERTH) and 5.1.1903 (K. No. 47).

This variety is here doubtfully maintained as distinct. More extensive collections may show that the King George's Sound specimens cited under the species are only a somewhat extreme form in their slender habit and small spikelets within the normal range of the species. The two specimens from Mt. Clarence, placed here with var. *fallax,* have the fine geniculate habit of the species, but the larger spikelets and panicle of the variety.

2. **A. avenaceus** R.Br., Prod., (1810), 175; Kunth, Enum., I (1833), 253.

TYPIFICATION: Western Australia, King George's Sound, R. Brown, Iter Australiense, 1802-5, No. 6229, HOLOTYPE (BM.; duplicate at K.).

SYNONYMS: *Aegopogon avenaceus* (R.Br.) Beauv., Agrost., (1812), 122. *Amphipogon strictus* var. *avenaceus* (R.Br.) Benth., Fl. Aust., VII (1878), 598. *Amphipogon Brownii* F. Muell., Fragm., VIII (1874), 201 in part.

Perennial, the culms arising from a contracted rhizome covered by more or less pubescent scales. Culms erect or somewhat geniculate at the nodes, exceeding the basal leaves, striate, about 20-35 cm. high, 3-5-noded, the nodes glabrous.

Sheaths rather close around the culm and glabrous in the only specimen seen. Blades glabrous, rather fine, inrolled-setaceous, 5-15 cm. long. Ligule shortly ciliate. Panicle exserted, spike-like, oblong-cylindrical, about 4 cm. long x 1 cm. wide, the spikelets overlapping, the rhachis and pedicels sub-glabrous to slightly pubescent, the pedicels 1-3 mm. long. Spikelets purplish to light brownish or straw-coloured, about 15 mm. long. Glumes enfolding the lemma, narrow-lanceolate and finely acuminate into a short awn-like tip, unequal, the lower about 12-13 mm. long, the upper 10-11 mm., 3-nerved, the nerves dorsal, the margins membranous, chaffy, smooth, glabrous. Lemma 11-12 mm. in all, consisting of a pointed callus about 1.5-2.5 mm. long covered with short, dense, white hairs about 0.2 mm. in length, and a cylindrical to narrowly obconical body about 3 mm. long uniformly covered with short white hairs, terminating in three fine firm bristles, and two narrow evanescent membranous lateral lobes, the bristles about 8 mm. long, glabrous on the back below, minutely scabrous above, the evanescent lobes about half as long. Palea of similar texture to the lemma covered with similar short hairs on the back in the lower part, the margins glabrous and chaffy, terminating in two evanescent membranous lobes and two dorsal bristles similar to those of the lemma. Anthers three, linear rather dark, about 5 mm. long. Grain not seen.

LOCALITIES: *Western Australia*: Only known from the Type specimen, King George's Sound, R. Brown, No. 6229 (BM.; K.).

Bentham (Fl. Austral., VII, 1878, 598), under *A. strictus* var. *avenaceus* cites Brown's specimen and "a few specimens from other localities above quoted." I cannot agree that any of the other specimens cited by Bentham are referable to *A. avenaceus* R. Br.

3. **A. turbinatus** R. Br., Prod., (1810), 175; Kunth, Enum., I (1833), 252; Benth., Fl. Aust., VII (1878), 599; Figured by Pilger in Diels & Pritzel, Engl. Bot. Jahrb., XXXV (1904), 73.

TYPIFICATION: Western Australia, King George's Sound, R. Brown, Iter Australiense 1802-5, No. 6226. HOLOTYPE (BM.; duplicate at K.).

SYNONYMS: *Aegopogon turbinatus* (R. Br.) Nees in Lehm., Pl. Preiss., II (1846), 101; *Amphipogon restionaceus* Pilger ex Diels & Pritzel in Engler's Bot. Jahrb., XXXV (1904), 72 (Figured).

Gamelythrum denudatum Nees ex Lehmann, Pl. Preiss., II (1846), 101, is also probably this species, but was described on material too inadequate to permit of exact identification.

Perennial, the erect, crowded culms arising from a condensed, horizontal rhizome, their bases enclosed by scales, the outer of which are often densely woolly-hairy. Culms mostly 30-50 cm. high, leafy chiefly in the lower parts, rather rigid, striate, smooth or microscaberulous, glabrous or sometimes slightly pubescent below the nodes, many-noded, the nodes glabrous and sometimes slightly glaucous, the lower nodes mostly covered by the sheaths. Sheaths mostly tight around the culms, smooth or microscaberulous, glabrous or obscurely pilose. Ligule shortly ciliate. Blades much recurved and flexuose, up to 15 cm. long, the upper blades much shorter and often reduced to 2 cm., inrolled-setaceous, pungent-pointed, smooth and glabrous on the outer (lower) surface, grooved and densely scabrous-pubescent on the inner (upper) surface. Panicles much exserted, spike-like, turbinate, about 1.5 cm. long excluding the bristles, and as broad, the pedicels very short, about 0.5 mm., and glabrous, the spikelets crowded, the lowest spikelets pseudo-verticillate, sterile. Glumes firmly membranous in texture, dark-coloured especially the lower glume and where exposed to light, densely ciliate especially about the middle, narrow lanceolate, 3-nerved with the nerves placed towards the centre of the glumes, the lower glume 12-16 mm. long in all, much exceeding the upper, narrowed above the middle into a long, acuminate bristle about 4-6 mm. long; upper glume 10-12 mm. long in all, narrowed into an acuminate point about 1-2 mm. long. Lemma about 11-16 mm. in length including the callus and bristles, with a densely silky-hairy, acuminate, stipe-like callus 3-3 mm. in length, the hairs about 0.2 mm. long; body of the lemma about 3 mm. long, rather densely appressed-silky-hairy, with three strong lobes, the lobes narrowing within 1-2 mm. into strong, spreading, scabrous bristles, the lobes and bristles together about 8-10 mm. in length, the lateral lobes with more or less evanescent outer margins which separate early into hyaline lobes and later break away. Palea as long as the lemma and of similar texture, appressed silky-hairy, with membranous margins which separate into 1-2 mm. long lateral lobes, and with two strong dorsal lobes narrowing into scabrous bristles as long as those of the lemma. Fruit oblong-turbinate, about 2.5 mm. x 1 mm., crowned by a darker, lid-like ridge.

LOCALITIES: *Western Australia*: Point Irwin, Oldfield (K.); Champion Bay, Oldfield (K.); Gnangarra, C. A. Gardner No. 7671, 19.9.1945 (PERTH); Tolimont, K. R. Allen, 19.9.1925 (PERTH); Wagin, C. A. Gardner No. 6488, 8.10.1942 (PERTH); Cowcowing, M. Koch No. 1135, 9.1904 (NSW. No. 1920; PERTH); Cannington, Canning River, A. Morrison, 6.10.1904 and 20.10.1909 (K.); Midland Junction, W. V. Fitzgerald, 9.1901 (NSW. No. 1921); Bassendean, C. B. Palmer, 1930 (K.); Bayswater, Swan River, A. Morrison, 22.11.1900, 20.10.1901 and 2.10.1909 (K.); Perth, J. H. Maiden, 10.1909 (NSW. No. 1919); King's Park, Perth, W. M. Carne, 8.10.1923 (PERTH); King's Park, Perth, R. Roe, 5.8.1934 (CAN); South Perth, W. M. Carne, 11.9.1926 (K.; PERTH); Claremont, A. Morrison, 20.10.1909 (K.); Swan River, Drummond No. 298 and 374 (K.); Swan River, Drummond No. 374, ex herb. Lemann (CGE.); Cottesloe, A. Lea, 9.1895 (PERTH); Lowden, on sand patches, M. Koch No. 2116, 12.1910 (K.; N.S.W. No. 1923); Lowden, Preston district, M. Koch and Pemberton No. 2116, 12.1910 (PERTH); North Bayswater, C. B. Palmer, 9.1929 (PERTH); SW. Australia, Drummond No. 378 (K.); Drummond, 1839, ex herb. Lindley (CGE.); King George's Sound, R. Brown No. 6226, 1802-5 (BM.; K.); Esperance, F. J. Daw, 10.1903 (NSW. No. 1922); between Esperance Bay and Fraser's Range, Dempster, 1876 (PERTH); Israelite Bay, J. P. Brooke, 10.1901 (PERTH).

After examining a range of specimens I am of the opinion that the differences given by Pilger between *A. turbinatus* R.Br. and *A. restionaceus* Pilger are not significant as specific characters. I have not seen the Type specimen of *A. restionaceus,* but the description is accompanied by an excellent figure. It seems probable that the specimens examined by Pilger which he regarded as *A. turbinatus* were immature and had not attained their full size. The only specimen I have seen which would agree with the dimensions and the figure of *A. turbinatus* R. Br. which he gives is that from Israelite Bay; this specimen is certainly immature.

4. **A. amphipogonoides** (Steud.) n. comb.

TYPIFICATION: Based on *Pentacraspedon amphipogonoides* Steud., Port du Roi Georg. N. Holl. (King George's Sound), ex herb. D'Urville, HOLOTYPE. I have seen only a single spikelet of the TYPE, but this amply served to enable recognition of this distinctive species.

SYNONYMS: *Pentacraspedon amphipogonoides* Steud., Syn. Pl. Gram., (1854), 151; *Amphipogon Pentacraspedon* Hack. ex Wawra, Itin. Princ. S. Coburgi, II (1888), 102, (based on *Pentacraspedon amphipogonoides* Steud.); *Amphipogon confusus* Domin, Jour. Linn. Soc. Bot., XLI (1912), 276 (based on the description of and specimens collected by Drummond cited under *A. laguroides* in Benth., Fl. Aust., VII (1878), 598, not *A. laguroides* R. Br.).

Perennial, the numerous culms arising from a contracted horizontal rhizome surrounded by glabrous scales. Culms erect or somewhat geniculate at the nodes, much exceeding the leaves, faintly striate, smooth or microscaberulous.

occasionally hirsute below the spike, about 20-40 cm. high, 3-6-noded, the nodes glabrous. Sheaths usually close around the culms, glabrous or distantly hirsute. Blades fine, inrolled-setaceous, finely pointed, microscaberulous on the outer surface, occasionally somewhat hirsute, grooved and scabrous-pubescent on the inner surface, 5-15 cm. long, the upper leaves much shorter. Ligule shortly ciliate. Spike much exserted, ovoid, about 1-1.5 cm. long and almost as broad, crowded, the rhachis glabrous, the pedicels absent or very minute. Glumes subequal, 5-7 mm. long, lanceolate, narrowing above into a rather long, acuminate point, densely hirsute below the scabrous-pubescent apex, rather obscurely 3-nerved, dark-coloured. Lemma much shorter than the glumes, about 3.5-4 mm. long, firm in texture, oblong, with three strong, scabrous-pubescent lobes above the middle and sometimes the membranous margins of the lateral lobes separable and produced into minute hyaline lobes, the lobes acuminate but not or scarcely awned, the central lobe often slightly longer and broader, the lemma uniformly appressed-silky-hairy below the lobes, the callus short and obtuse. Palea as long as the lemma and of similar texture, appressed-silky-hairy, divided above the middle into two firm dorsal acuminate lobes similar to those of the lemma, and with membranous margins produced into two lateral membranous lobes a little shorter than the dorsal lobes. Lodicules broad. Anthers linear, 2-2.5 mm. long. Ovary linear. Styles fused in the lower part.

LOCALITIES: *Western Australia*: Bow River, S. W. Jackson, 12.1912 (NSW. No. 1870); Mundaring, C. B. Palmer, 1930 (K.); Midland Junction, W. V. Fitzgerald, 9.1901 (NSW. No. 1873; PERTH); Bayswater, W. V. Fitzgerald, 9.1901 (NSW. No. 1872; PERTH); Smith's Mill, Darling Range, A. Morrison, 13.11.1897 (K.); Swan River, Drummond (K. 3 sheets); Swan River, Drummond, 1839, ex herb. Lindley (1 sheet), and ex herb. Lemann (1 sheet) (CGE.); Marbellup, H. Sheath, 12.1902 (NSW. No. 1871).

Bentham, in the Flora Australiensis, confused this species and *A. laguroides*. The description he gives under *A. laguroides* applies in part to both species. Of the specimens he cites, that of Robert Brown is presumably the No. 6225 in the Kew Herbarium, which is certainly *A. laguroides* R.Br. and in fact part of the Type of that species; "Drummond, 1st Coll." must refer to three sheets at Kew which are named "*A. laguroides* Br." in Bentham's handwriting. These three are *A. amphipogonoides*. They are Syntypes of *A. confusus* Domin, and one of them, that which bears a printed label "Swan River, Drummond, 1839", I have designated Lectotype of *A. confusus*.

5. **A. laguroides** R. Br., Prod., (1810), 175; Kunth, Enum., I (1833), 252.

TYPIFICATION: Western Australia, King George's Sound, R. Brown, Iter Australiense, December 1801, No. 6225, HOLOTYPE (BM.; duplicate at K.).

SYNONYMS: *Aegopogon laguroides* (R.Br.) Beauv., Agrost., (1815), 122. *Amphipogon cygnorum* Nees ex Lehmann, Pl. Preiss., II (1846), 100; Domin in Jour. Linn. Soc. Bot., XLI (1912), 277.

Erect, rather rigid perennial, caespitose or from a short, contracted rhizome, 25-30 cm. high, the scales at the base of the culms often with a few hairs towards the base. Culms 4-5- rarely 6-noded, lightly to deeply striate, more or less microscaberulous between the nerves, typically glabrous but occasionally with scattered tubercle-based hairs, the internodes much exceeding the sheaths, the nodes glabrous or rarely with a few sparse hairs. Sheaths closely enclosing the culms, lightly striate, microscaberulous between the nerves, glabrous to lightly hirsute with tubercle-based hairs. Ligule ciliate with hairs 0.5-2 mm. long. Blades up to 20 cm. long, those of the culm progressively shorter upwards, the uppermost sometimes reduced to 1 cm., often somewhat flexuose, usually convolute, occasionally somewhat flattened, rigid, finely pungent-pointed, the outer surface scaberulous, the inner surface ribbed and densely scabrous-pubescent on the ridges. Panicle rather shortly exserted, capitate, dense, ovoid-globular to slightly turbinate-ovoid or very shortly oblong, 1-1.5 cm. long, the spikelets sub-sessile, the outer spikelets verticillate, narrow and sterile, the culm smooth and glabrous below the panicle. Glumes narrow-lanceolate, tapering into fine points, nearly equal, about 5-6 mm. long, rather thin-textured, more or less densely hirsute with tubercle-based hairs. Lemma usually about 8-10 mm. long (but sometimes up to 16 mm.) in all including the short callus and the lobes, lanceolate, 7-nerved, the nerves not conspicuous, firm-textured, silky-pubescent between the nerves in the lower part, 3-lobed from about 2.5 mm. from the base, the lower broader parts of the lobes scabrous-pubescent on the back, the upper parts produced into long, scabrous bristles about 5-6 mm. long, sometimes purplish-tinted, the central bristle usually the longest, the margins of the lobes thickened, the lemma with scarcely any membranous margins. Palea almost equally the lemma and of similar texture, pubescent on the back, deeply 2-lobed to within 1-1.5 mm. of the base, the lobes produced into long bristles. Anthers about 1-1.3 mm. long.

LOCALITIES: *Western Australia*: A. G. Hamilton, 1902 (NSW. No. 1864); SW Australia, Drummond, 1848 (K.); Gnangarra, C. A. Gardner, 10.1945 (PERTH); District Murray, "in silvis apertis arenosis Eucalypti marginatae," E. Pritzel No. 122, 12.1901 (K.; NSW. No. 1860; PERTH), this number cited by Domin as *A. cygnorum;* Mundaring, C. B. Palmer, 1930 (K.); Bow River (SW Australia), S. W. Jackson, 12.1912 (NSW. No. 1863); Bayswater, A. Morrison, 24.12.1897, No. 835, 8.12.1898 and No. 833, 6.12.1902 (K.); "In arenosis ad flumen Cygnorum", L. Preiss No. 1851, 1840, Duplicate TYPE of *A. cygnorum* Nees (MEL.); Bassendean, C. B. Palmer, 1930 (K.); Waneroo, sandy country, C. A. Gardner (K. No. 56); Swan River, Drummond No. 218, 373 and 398 (K.); Swan River, Drummond (K.); Swan River, Drummond, 4th Coll. No. 373, and No. 392 ex herb. Lemann, and 1844 No. 398 ex herb. Lemann (CGE.); Cottesloe, W. V. Fitzgerald, 12.1899 (NSW. No. 1866, 1867); Lowden, in forests, M. Koch No. 2115, 12.1910 (NSW. No. 1868); Lowden, in swamps, M. Koch No. 2114, 12.1910 (K.; NSW. No. 1865); Vasse River, Molloy, 1839, ex herb. Lindley (CGE.); Cannington, Canning River, A. Morrison, No. 834, 20.12.1901 (K.); Balingup, R. H. Pullein, 12.1917 (NSW. No. 1862); King George's Sound, R. Brown, It. Aust., 12.1801, No. 6225 (BM.; K.); King George's Sound, A. Oldfield No. 663, this number cited by Domin (K.; PERTH; MEL.); Albany, ex herb. W. V. Fitzgerald, 11.1907 (NSW. No. 1861); near Albany, open heathy ground, ex herb. Cecil Andrews, 1st Coll. No. 1214, 5.1.1903, cited by Domin (K.).

The specimen from Lowden, M. Koch No. 2115 is somewhat unusual in having wider membranous margins to the outer edges of the lateral lobes of the lemma and of the palea, and in the more distinctly creeping rhizome, but it appears to be conspecific with the other specimens cited.

After examining the duplicate Type specimen in the Melbourne Herbarium of *A. cygnorum* Nees, I am satisfied that it is conspecific with *A. laguroides* R. Br. The characters given by Nees do not differ in any respect from *A. laguroides,* and from an examination of a range of material it is evident that there is no discontinuity in the habit and size of the lemmas which would justify its recognition as a distinct species. The specimen Oldfield No. 663 (cited by Domin, l.c. as *A. laguroides* R. Br.) and that of Pritzel No. 122 (cited by Domin as *A. cygnorum* Nees) seem to be definitely conspecific.

Bentham (Fl. Aust., VII, 1878, 598) placed specimens of *A. amphipogonoides* under *A. laguroides,* and his description applies in part to that species; the specimens of Drummond's which he cites are *A. amphipogonoides.* His description of *A. cygnorum* and the specimens cited thereunder are all referable to *A. laguroides* R. Br.

A. caricinus F. Muell., Linnaea, XXV (1852), 445.

TYPIFICATION: South Australia, "Gramen caricinum inter petras montium Elder's Ranges, Crystal Brook," F. Mueller, 10.1851, LECTOTYPE (MEL.).

SYNONYMS: *Amphipogon Brownii* F. Muell., Fragm. Phyt. Austr., VIII (1874), 201 in part; *A. strictus* var. *occidentalis* Pilger ex Diels et Pritzel, Engl. Bot. Jahrb., XXXV (1904), 71; *A. strictus* var. *desertorum* Domin in Jour. Linn. Soc., Bot., XLI (1912), 276. Figured: Ag. Gaz. N.S.W., III (1893), 748 as *A. strictus;* Turner, Australian Grasses (1895), 2 as *A. strictus.*

Erect, rather rigid perennial, often 20-50 cm. high, caespitose or with a very short, compact, erect or oblique rhizome, the scales at the base of the culms often more or less pubescent. Culms lightly striate, smooth or somewhat microscaberulous in the grooves, about 4-noded, sometimes slightly geniculate at the nodes, the nodes glabrous, the internodes exceeding the sheaths. Sheaths smooth or slightly microscaberulous, usually glabrous but occasionally somewhat hirsute, sometimes slightly pubescent adjacent to the node, closely enclosing the culms. Ligule shortly ciliate. Blades convolute (rarely somewhat flattened), finely pointed, up to 15 cm. long, the upper leaves shorter, usually glabrous but occasionally somewhat hirsute, striate and microscaberulous on the outer surface, broadly ribbed and more or less smooth or scaberulous on the inner surface. Panicle at length exserted, narrow-cylindrical, 2-4 (rarely up to 6) cm. long, spike-like, the spikelets overlapping but arranged rather more loosely and distantly than in *A. strictus,* sometimes with a few small abortive spikelets in the lower part, the short branches and the rhachis smooth and glabrous or scabrous to scabrous-pubescent, the spikelets on pedicels 0.5-2 mm. long. Spikelets pale to straw-coloured, sometimes tinged with purple, about 9 mm. long. Glumes enfolding the lower part of the lemma, unequal, broadly ovate, narrowed into a short, acute, remotely ciliolate tip, often more or less irregularly torn at the apex at maturity, somewhat papery in texture, usually remotely scabrid with a few scattered, ephemeral, tubercle-based hairs, 3-nerved, the nerves dorsal, the lower glume about 4.5-6 mm. long, the upper about 6-7 mm. long. Lemma about 7-8 mm. long including the short callus and the aristate lobes, somewhat gibbous indurated, the body scrobiculate with two dorsal vertical bands of appressed silky hairs, about 2.5-3 mm. long, strongly 3-lobed, the lobes about twice as long as the body of the lemma, narrowed into bristles, the bristles at length spreading, their margins thickened and densely ciliate to the apex, the margins of the lemma membranous and separating early into two evanescent, broad, supplementary lobes about 3 mm. long which soon fracture at the base leaving an abruptly truncate scar. Palea 2-lobed, almost as long as the lemma, smooth, the lobes similarly ciliate, rather narrow, with membranous margins which early separate into hyaline lobes. Anthers 3, about 3 mm. long, linear.

LOCALITIES: *Queensland*: Roma, C. T. White No. 11067, 5.1935 (BRI.); Wyandra, C. Sutton, 11.1930 (BRI); between Wyandra and Charleville, S. L. Everist and C. T. White No. 52, 26.5.1936 (BRI.); Charleville, E. W. Bick, 12.1916 (BRI.; NSW. No. 2143); Warrego District, Charleville, McClemens, 10.1945 (BRI.; NSW. No. 2142); Yanna Siding, near Charleville, J. D. Hutchinson, 4.1934 (K.; BRI.); Charleville, C. Tidswell (BRI.); Charleville, C. E. Hubbard and C. Winders No. 6099, 2.1.1931 (K.; NSW. No. 6570), and No. 6116, 2.1.1931 (K.; NSW. No. 6572); Warrego District, Charleville, ca. 1,000 feet, S. T. Blake, 19.4.1934 (STB. No. 5368; NSW. No. 2713) and 5.4.1936 (STB. No. 11065; NSW. No. 2716); Warrego District, between Charleville and Westgate, S T. Blake, 20.4.1934 (STB. No. 5419; NSW. No. 2714); Paroo River, C. Edwards, 1.1922 (BRI.); Warrego District, Eulo, ca. 650 feet, S. T. Blake, 22.6.1936 (STB. No. 11729; NSW. No. 2715); Nindigully district, R. Roe, 11.1938 (CAN.); Maranoa District, 50 miles E of Cunnamulla, F. W. Whitehouse, 12.1933 (STB.); Cunnamulla, J. S. Latham No. 11, 22.2.1936 (BRI.); St. George, I. F. Kirby, 8.6.1937 (BRI.); "Gilruth Plains", Cunnamulla,

G. H. Allen, 29.9.1942 (CAN.); Lurnea, C. E. Hubbard and C. W. Winders No. 6090, 1.1931 (K.; NSW. No. 6571). *Northern Territory*: Rumbalara, J B. Cleland, 8.8.1936 (K.). *New South Wales*: Paroo River, per J. H. Maiden, 8.1894 (NSW. No. 2147); West of Paroo River, A. W. Mullen, 1903 (NSW. No. 2136); Waverley Downs to Hungerford, J. L. Boorman, 10.1912 (NSW. No. 2135); Waverley Downs, A. W. Mullen, 4.1906 (NSW. No. 2139); Walgett to Collarenebri, J. Vickery, 21.12.1934 (NSW. No. 2131); Toorale to Goonery, J. L. Boorman, 10.1912 (NSW. No. 2137, 2138); Byrock, J. Vickery, 22.12.1934 (NSW. No. 2140; SYD.); Byrock, E. Betche, 9.1885 (NSW. No. 2144); 4 miles SE of Byrock, K.H.L. Key, 9.1940 (CAN.); Liverpool Plains, 2.1880 (NSW. No. 2141); Coolabah, A. W. Mullen, 5.1914 (NSW. No. 2132); Coolabah District, J. C. Butchee, 7.2.1941 (NSW. No. 2130); Cobar, L. Abrahams, 1910 (NSW. No. 2133); Cobar, K. G. Carn, 26.9.1936 (NSW. No. 2129); near Mt. Hope, J. L. Boorman, 5.1906 (NSW. No. 2145); Croker's Range, Lat. S. 33° Long. E. 148°, A. Cunningham, 11.1825 (K.). *Victoria*: Murray River, F. Mueller, 1848 (MEL.; NSW. No. 2151; K.); Mildura, E. J. Sonenburg, 5.1.1933 (K.). *South Australia*: Towards Lake Amadeus, Giles, ex. herb. F. Mueller, 1877 (K.); Wilpena Pound, J. B. Cleland, 30.11.1930 (K.); Victoria Desert, R. Helms, 13.9.1891 (K.; NSW. Nos. 2148, 2149, 2150); "Gramen caricinum inter petras montium Elder's Ranges, Crystal Brook", F. Mueller, 10.1851, LECTOTYPE (MEL.); Plains at Crystal Brook, F. Mueller, 4.11.1851 (MEL.); Elder's Range, F. Mueller, 10.1851 (MEL.); Mr. Gosse's Expedition, Centre of South Australia, No. 156, comm. R. Schomburgh, HOLOTYPE of *A. strictus* var. *desertorum* Domin (K.); Eighty miles N of Renmark, J. B. Cleland, 1.1921 (K.; NSW. No. 2249); Berri, J. B. Cleland, 1.1921 (K.); Alawoona, J. B. Cleland, 12.1913 (K.; NSW. No. 2248); Murray Bridge, J. H. Maiden, 1.1907 (K.; NSW. No. 2247); Wynarka, T. T. Colquhon, 12.1936 (ADW. No. 3429); Aldinga Bay, J. B. Cleland, 2.12.1923 (K.; NSW. No. 2250; Kinchina, J. B. Cleland, 8.11.1924 (K.). *Western Australia*: W. C. Grasby, 5.1908 (NSW. No. 2246); Mt. Narryer, F. Tyson, No. 41, 1898 (K.; PERTH); Cowcowing, on sand plains, M. Koch No. 1214, 10.1904 (cited by Domin in Jour. Linn. Soc., Bot., XLI, 1912, 276, as *A. strictus* var. *occidentalis* Pilg.), (K.; NSW. No. 2242; PERTH); near Yellowdine, C. A. Gardner No. 8019, 20.10.1945 (PERTH); Merriden, J. H. Maiden, 10.1909 (NSW. No. 2244); Kellerberrin, R. B. Leake, 9.1899 (K. No. 54); Perenjin, G. L. Sutton, 2.1926 (PERTH); Moonine Rock, W. E. Blackall No. 894, 5.10.1931 (PERTH); Canna Siding, C. A. Gardner, 11.1933 (K.; PERTH); Pindar, J. H. Maiden, 10.1909 (NSW. Nos. 2251, 2252); Carnamah, A. Morrison, 2.11.1906 (K.); Swan River, Drummond (K.); Perth, Woods and Forests Department, 9.1900 (NSW. No. 2243); Laverton, F. Mottram, 13.11.1930 (K. No. 46; PERTH); King George's Sound, Bagster (K.); King George's Sound, ex herb. F. Mueller, 24.12.1877 (PERTH); South-west of Western Australia, inland, J. E. Davies, 1938 (CAN.).

6a. var. **sericeus** n. var.

Typification: *Queensland*, Mt. Howitt Station, about eighty miles W of Eromanga, on drifted sand, S. T. Blake, 4.7.1936, HOLOTYPE (STB. No. 12064; duplicate at NSW. No. 2708).

Ab typo lemmata in dorso aequabiliter et breviter appresso-pubescente, ad latera glabro differt. Lemma 9-10 mm. longa, raro usque 13 mm. Laminae usque 25 cm., saepe planae, aliquando plus minusve valde involutae, scabrae; laminae vaginae culmique plerumque pubescentes vel hirsutae. Paniculae rami rhachisque scabro-pubescentes vel hirsuti.

Lemma uniformly and shortly appressed-hairy over the dorsal region, the hairs not localised in two distinct bands as in the typical form, glabrous towards the sides, usually 9-10 mm. long, occasionally up to 13 mm. Leaves up to 25 cm. long, often flat, sometimes becoming more or less strongly inrolled, rough, and together with the sheaths and culms usually pubescent to hirsute.

Localities: *Queensland*: Noondoo near Dirranbandi, on a stony ridge, ca. 550 feet, S. T. Blake, 29.2.1936 (STB. No. 10609; NSW. No. 2707); West of Pentland, between Warrigal and Burra, on shallow sand overlying sandstone, S. T. Blake, 19.10.1935 (STB. No. 9943; NSW. No. 2712); 18 miles W of Jericho, 1100 feet, S. T. Blake, 7.12.1935 (STB. No. 10391; NSW. 2709); near Boulia, on stony hillsides, S. T. Blake, 24.7.1936 (STB. No. 12382; NSW. No. 2710); Mundubbera,

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H. S. Bloxone, 1931 (BRI.); Milo, Adavale, Milo Past. Co., 11.10.1939 (BRI.); South of Jundah, on reddish sand, S. T. Blake, 11.7.1936 (STB. No 12064; NSW. No. 2708); Quilpie, Western Queensland, A. K. Shield, 12.1933 (BRI.); Mt. Howitt Station, about 80 miles W of Eromanga, on drifted sand, S. T. Blake, 4.7.1936 (STB. No. 11948; NSW. No. 2711); "Penaroo" via Eulo, Warrego district, F. J. Young No. 69, 6.1934 (BRI.). *Northern Territory*: Rockhampton Downs Station, about 19°23′ S., 135°12′ E., S. T. Blake, 19.5.1947 (STB. No. 17879; NSW. No. 4730). *Central Australia*: Granites, J. B. Cleland, 15.8.1936 (K.). *Western Australia*: Between Pardoo Stn. and Mt. Goldsworthy, N. T. Burbidge No. 1654, 3.8.1941 (PERTH); Calawah, A. J. Anderson, 15.8.1936 (PERTH).

b. var. **scaber** n. var.

TYPIFICATION: Queensland, Stanthorpe, 3,000 ft. altitude, granite residue soil, C. E. Hubbard, No. 5688, 11.3.1931, HOLOTYPE (NSW. No. 7187; duplicate at K.).

Ab typo lemmata in dorso aequabiliter et breviter appresso-pubescente, et setis scabris haud vel minutissime ciliatis, sed lobis lateralibus evanescentibus saepe paullo ciliatis ad apices differt. In specimine typo glumae hirsutae.

Differs from the type in the lemma more or less uniformly covered with short, appressed silky hairs on the dorsal region below the lobes as in var. *sericeus*, and in the scabrous bristles not or very minutely ciliate, the evanescent lateral lobes often slightly ciliate at the tips. Glumes very hirsute in the type specimen.

LOCALITIES: *Queensland*: Henley Park, 12 miles E of Yalleroi, S. L. Everist No. 1936, 6.12.1939 (K.; BRI.); Dogwood Creek near Gurulmindi, E. Belson, 1930 (K.); East of Gurulmindi, E. Belsen, 1930 (K.); Stanthorpe, 3000 feet altitude, granite residue soil, C. E. Hubbard No. 5688, 11.3.1931 (NSW. No. 7187; K.).

A. caricinus closely resembles the variable *A. strictus* R. Br. in many respects, and has often been confused with it, but I consider that there is ample justification for retaining it as a distinct species. It occurs in the drier districts of several States, while the forms of *A. strictus* are generally to be found in the moister coastal and tableland areas. In the eastern States, *A. caricinus* is readily distinguishable by the more tufted habit with short, more or less erect rootstock, the narrow, cylindrical, longer raceme with more distantly arranged spikelets, and, in the type form, the lobes of the lemma generally not more than twice as long as the base, the bristles at length much spreading or reflexed and ciliate-plumose to their apices. In Western Australia the difference in habit is said to be less marked, and it is possible that further work may show that there is in this instance an example of geographic speciation in migration from west to east. The two varieties appear to be confined to eastern Australia, and are similar in habit to the type form. They both differ from the type form in having the hairs on the back of the lemma evenly distributed and not confined to two distinct bands. In var. *sericeus* the bristles are ciliate as in the type form. In var. *scaber* the bristles are scabrous but not ciliate.

Bentham (Fl. Aust., VII, 1878, 598) referred specimens of this species to *A. strictus* R. Br. These are:—Towards Lake Amadeus (in the interior), Giles; Swan River, Drummond (without number); Croker's Range, 11.1825, Lat. S. 33° Long. E. 148°, A. Cunningham. Other specimens at Kew, which Bentham examined and named *A. strictus*, but did not specifically cite, and which I consider to be *A. caricinus*, are:—King George's Sound, Bagster; Murray, F. Mueller; Crystal Brook, F. Mueller; Swan River, Drummond No. 144 (named by Bentham as *A. strictus* var. *setifer*).

A. strictus var. *desertorum* Domin, of which the TYPE has been seen at Kew, is certainly *A. caricinus*. I have not seen the Type of *A. strictus* var. *occidentalis Pilger,* but his description would agree well with the type form of

A. caricinus F. Muell. I have seen the specimen cited by Domin under this variety, viz., Cowcowing, M. Koch No. 1214, in Jour. Linn. Soc., Bot., XLI (1912), 276. This specimen is very immature. The spikelets are rather small, the glumes firm, and the panicle very narrow, but only to the extent to be expected in such an immature condition. Only such other specimens as are similarly immature can be matched with it, e.g. Perth, Woods and Forests Dept., 9.1900; Merriden, J. H. Maiden, 10.1909; Moonine Rock, W. E. Blackall No. 874; Near Yellodine, C. A. Gardner No. 8019. I can find no discontinuity of structure which would justify its retention as a distinct variety.

7. A. strictus R. Br., Prod., (1810), 175; Kunth, Enum., I (1853), 252.

TYPIFICATION: *New South Wales*: Port Jackson, R. Brown, Iter Australiense, No. 6227, 1802-5, HOLOTYPE (BM.; duplicate at K.).

SYNONYMS: *Aegopogon strictus* (R. Br.) Beauv., Agrost. (1812), 122; *Amphipogon Brownii* F. Muell., Fragm., VIII (1874), in part; *A. elatior* Gandoger, in Bull. Soc. Bot. France, LXVI (1919), 298 in clavi; *A. imbricatus* Gandoger, l.c., in clavi; *A. pinifolius* Mez in Fedde Repert. Sp. Nov., XVII (1921), 212.

Perennial, erect or very slightly geniculate, the culms arising singly at close intervals from a contracted, horizontal rhizome, usually about 25-35 cm. high. Culms slender, leafy near the base, about 3-noded above, very slightly striate, smooth or minutely scaberulous, sometimes minutely flecked with purple, the upper internodes much exceeding the sheaths, the nodes glabrous. Sheaths close around the culms, smooth or minutely scaberulous, glabrous or with a few scattered hairs in some varieties, hirsute in others, often purplish. Ligule ciliolate. Blades rigid, somewhat pungent-pointed, stiffly infolded to the middle, in some varieties very short, 1-5 cm., in other varieties up to 15 cm. in length. Panicle ovoid, capitate, spike-like, rather dense, 1-2 cm. long by 1-1.5 cm. broad, the rhachis and pedicels somewhat scabrous, the pedicels very short. Spikelets often rather dark-coloured, about 8-12 mm. long. Glumes 3-nerved, unequal, entire, acute, usually shortly pointed, rarely somewhat obtuse, broadly ovate, enfolding the lower part of the lemma, chaffy, distantly scabrous-pubescent and sometimes with a few tubercle-based cilia in the upper part, the margins slightly ciliolate near the apex, the lower glume 5-7 mm. long, the upper about 6-8 mm. Lemma about 8-12 mm. long including the short, obtuse callus and the aristate lobes, the body somewhat indurated, rugose, with two dorsal vertical bands of silky appressed-hairs, about 2.5 mm. long, strongly three-lobed, the lobes usually more than twice as long as the body, narrowed into erect or slightly divergent bristles, their margins thickened and bearing short cilia which diminish towards the scabrous tips, the margins of the lemma broad and membranous, separating early into two evanescent supplementary lobes about 4 mm. long which soon fracture at the base leaving an abruptly truncate scar. Palea 2-lobed, almost as long as the lemma, smooth, rather narrow with membranous margins which early separate into hyaline lobes, the dorsal lobes thickened and shortly ciliate to scabrous like those of the lemma. Anthers three, about 4 mm. long, linear.

A. strictus sensu stricto.

Leaves very short, mostly 1-5 cm. long, sometimes rather crowded at the base of the culm for about 5 cm., those of the culm more or less glabrous, those of the innovations sub-glabrous, distantly hirsute to conspicuously and rather densely hirsute and sometimes slightly bluish in colour. Glumes more or less scabrous-pubescent with few or no cilia on the back in the upper part. Lemma mostly 9-10 mm. long, the bristles more than twice as long as the body.

Localities: *Queensland*: Stanthorpe, H. Tryon (K.; BRI); Wyerba, in damp places on rocky hillsides, 2500-3000 feet, S. T. Blake, 24.1.1933 (STB. No. 4647; K.; NSW. No. 2751); Near Wyerba, bank of Bald Rock Creek, 2500-3000 feet, S. T. Blake, 21.1.1933 (K.; STB. No. 4615; NSW. No. 2750); Wallangarra, ca. 3000 feet, in rocky places, S. T. Blake, 17.1.1933 (this specimen taller and with longer leaves than normal) (STB. No. 4524; K.). *New South Wales*: Wellington Valley, A. Cunningham, 11.1825 (K.); Drummoyne, H. Deane No. 65, 11.1884 (NSW. No. 2154; K. No. 407); Port Jackson, R. Brown No. 6227 (BM.; K.); Parramatta, Woolls (K.; NSW. No. 2156); Blue Mountains, J. L. Boorman, 4.1908, Kneucker: Gram. Exsicc. No. 741, TYPE NUMBER of *A. pinifolius* Mez (NSW. No. 2160); Blue Mountains, Betche, 12.1882 (NSW. No. 2164); King's Tableland, Wentworth Falls, A. A. Hamilton, 1.1915 (NSW. No. 2163); King's Tableland, Wentworth Falls, J. Vickery, 2.8.1930 (NSW. No. 2174; K. No. HC 32); Wentworth Falls, J. Vickery, 3.8.1930 (NSW. No. 2169); Blackheath, L. Stephenson, 12.1889 (NSW. No. 2162; K. No. 406); Blackheath, A. A. Hamilton, 1,1900 (NSW. No. 2165); Mt. Victoria, A. A. Hamilton, 1.1915 (NSW. No 2167; BRI.); On road to Mt. Victoria Falls, O. D. Evans, 21.1.1930 (SYD.; CAN.); Mt. Victoria, J. H. Maiden, 12.1896, TYPE NUMBER of *A. imbricatus* Gandoger (NSW. No. 2161); Mt. Victoria, J. H. Maiden, 12.1896 (NSW. No. 2159); Bell, A. A. Hamilton, 1.1915 (NSW. No. 2158); Kanimbla Valley, Blackheath, W. Forsyth, No. 33, 1.1900 (NSW. No. 2173); Clarence, W. F. Blakely, 25.11.1939 (NSW. No. 2172); Eskbank, A. A. Hamilton, 1.1915 (NSW. No. 2168); Newnes Junction, A. A. Hamilton, 4.1914 (NSW. No. 2166; Colong to Mt. Werong, R. H. Cambage No. 3208, 5.11.1911 (NSW. No. 2157; SYD.); Wingello, J. L. Boorman, 11.1899 (K.; NSW. No. 2155; BRI.).

I have not seen the Type of *A. elatior* Gandoger, but from the brief diagnosis, and the locality of the Type collection, I have no doubt that it belongs to the type form.

A. imbricatus Gandoger and *A. pinifolius* Mez, of which duplicates of the Type numbers are in the National Herbarium of New South Wales, were described from specimens collected on the Blue Mountains, probably at rather high altitudes, in which the leaves of the innovations are more conspicuously and densely hirsute than in the Type. This form appears to be characteristic of very exposed tableland areas. However, I have found this character to vary imperceptibly among the specimens examined from an almost glabrous to a strongly hirsute condition. The Type specimen collected by Robert Brown has moderately hirsute leaves. It is an excellent specimen in which the horizontal rhizome is admirably represented.

7a. var. **setifer** Benth., Fl. Austral., VII (1878), 598.

Typification: South Australia, Lofty Ranges, F. Mueller, HOLOTYPE (K.).

Blades up to 9 cm. long, sub-glabrous. Panicle oblong, the rhachis more densely scabrous-pubescent. Glumes more strongly pubescent and, especially the lower glume, ciliate with tubercle-based hairs on the sides of the back in the upper part, slightly larger than in the type form. Lemma 11.12 mm. long, the lobes at length spreading, bearing cilia up to 0.6 mm. in length.

Localities: *Victoria*: Glenelg River, Robertson (K.); Grampians, C.W., 11.1899 (ADW. No. 233); Grampians, H. B. Williamson, 11.1900 (NSW. No. 2153); Seymour, A. Meebold No. 2158 F, 11.1936 (NSW. No. 2234). *South Australia*: Lofty Ranges, F. Mueller (K.); "In montibus elatioribus sterilibus sic dictis Lofty-ranges, rarius," F. Mueller, 12.1850 (MEL.); Oldfield (K.); "In collibus sterilioribus ante montes Lofty-ranges," F. Mueller, 1.1851 (MEL.); Sand scrub, near Tanunda, Behr, 1.1849 (MEL.); Mylor, J. F. Bailey, 26.11.1930 (K.); Coonandook, H. A. Follett, 25.10.1937 (ADW. No. 3758); Victor Harbour, Pescott, 10.1.1924 (ADW. No. 234); Aldgate, J. H. Maiden, 1.1907 (NSW. No. 2233); Encounter Bay, J. B. Cleland, 18.1.1824 (K.). *Western Australia*: Maddington, Stoward, 12.1916 (K.; PERTH); Albany, on slopes of Mt. Clarence, C. T. White, No. 5316, 6.11.1927 BRI.).

7b. var. **hirsuta** n. var.

Typification: Western Australia, Wooroloo and Oulina River, M. Koch No. 1827 in part, 11.1907 (NSW. No. 2240), HOLOTYPE.

Rhizoma brevissima densissima; laminae longae ad 15 cm., graciliores, minus rigidae, manifeste hirsutae; penicula oblonga; glumae ciliatae; lemma 10-11 mm. longa, lobis tandem divergentibus, quam corporem circa duplo longioribus.

Rhizome very short and dense. Leaves long, up to 15 cm., more slender, less rigid, more or less conspicuously hirsute. Panicle oblong. Glumes more or less ciliate as in var. *setifer*. Lemma 10-11 mm. long, the lobes at length spreading, about twice as long as the body of the lemma.

Localities: *Western Australia*: Gingin, C. A. Gardner, 3.12.1923 (K. No. 43; PERTH); Wooroloo and Oulina River, M. Koch No. 1827 in part, 11.1907, (NSW. No. 2240); Northampton, comm. C. A. Gardner, 10.1898 (K. No. 48); Northampton, R. Helms, 10.1898, specimen immature (K. No. 53; PERTH); Northampton, C. A. Gardner, 1930 (PERTH); Kauring, on York-Green hills line, F. Stoward (K. No. 513); Swan River, Drummond No. 987 (K.); Beenup, A. Morrison (3 sheets), 10.12.1904 (K.).

7c. var. **breviseta** n. var.

Typification: Western Australia, Oulina, M. Koch No. 1827, 11.1907, in part, HOLOTYPE (NSW. No. 2238; duplicate at K.).

Laminae vaginaeque saepe hirsutae; glumae ciliatae; lemma 8-9 mm. longa, lobis quam corporem vix duplo longioribus, ciliis ad apices scabridis diminuendis.

Localities: *Western Australia*: Oulina, M. Koch No. 1827, 11.1907, (NSW. about 8-9 mm. long, the lobes not more than twice as long as the body (as in *A. caricinus*), but the cilia diminishing towards the scabrous apices.

Localities: *Western Australia*: Oulina, M. Koch No. 1827, 11.1907 (NSW. No. 2238); Wooroloo and Oulina River, M. Koch No. 1827 in part, 11.1907 (NSW. No. 2237); 8 miles from Balladonia, W. E. Blackall No. 1211, 29.10.1931 (PERTH); Narrogin, Stoward, 5.1915 (NSW. No. 2235); near Pingelly, W. V. Fitzgerald. 10.1903, specimen immature (NSW. No. 2239); Farm Etna, near Broomhill, A. Meebold No. 1559, 11.1928 (K.); Swan River, Drummond, 1839 (K.); Drummond No. 982 (K.); Swan River, Drummond, 1839, ex herb. Lindley (CGE.).

The type number of this species was cited by Domin (Jour. Linn. Soc. Bot., XLI, 1912, 276) as *A. strictus* var. *setifer* Benth., but it appears distinct enough to be well worthy of separate varietal status.

The following is an analysis of the specimens cited under *A. strictus* by Bentham (Fl. Aust., VII, 1878, 598), and the species and varieties to which they are referred in the present revision. As previously noted, the specimens: Towards Lake Amadeus (in the interior), Giles; Swan River, Drummond (without number); Croker's Range, A. Cunningham, are referrable to *A. caricinus* F. Muell. The following: Port Jackson, R. Brown; Parramatta, Woolls, are *A. strictus* sensu stricto. Lofty Range, F. Mueller (cited under var. *setifer*); and Glenelg River, Robertson (cited under *A. strictus,* but written up as var. *setifer* by Bentham) are referrable to var. *setifer* Benth. Swan River, Drummond No. 982, and two sheets of Swan River, Drummond, 1839 (written up by Bentham as var. *setifer,* but presumably those cited under *A. strictus* as Drummond, 1st Coll.) are var. *breviseta* J. Vickery. Swan River, Drummond No. 987 is var. *hirsutus* J. Vickery. King George's Sound, R. Brown (cited by Bentham under var. *avenaceus*) is a distinct species, *A. avenaceus* R. Br. A few other specimens cited by Bentham have not been seen by me.

A number of other specimens preserved at Kew were written up by Bentham and doubtless used by him in the preparation of the Flora Australiensis, but were not specifically cited. For the sake of completeness, these are referred to their correct positions, as follows: Oldfield (without locality) has been correctly written up as var. *setifer* by Bentham. South Australia, Oldfield (named by Bentham as var. *setifer*) is var. *breviseta* J. Vickery. The following specimens named *A. strictus* by Bentham are referrable to *A. caricinus* F. Muell., viz., Swan River, Drummond (without number); King George's Sound, Bagster; Swan River, Drummond (No. 144 (very immature); Murray, Dr. Ferd. Mueller: Crystal Brook, F. Mueller.

Imperfectly Known Species.

Amphipogon gracilis Nees in Lehmann, Pl. Preiss., II (1846), 101. Syn.: *A. strictus* var. *gracilis* (Nees) Benth., Fl. Austral., VII (1878), 598; *A. Brownii* F. Muell., Fragm., VIII (1874), 201 in part. This species was described from a specimen collected in Western Australia, at Currie, York, April, 1840, herb. Preiss No. 1831. According to the author the specimens were past their prime, and the florets all dropped except one. I have seen a duplicate of the Type collection located in the National Herbarium, Melbourne, on which two somewhat mutilated florets are still present. These lack the tips of the bristles, which have fractured, and the cilia of the bristles have been similarly lost. The specimen somewhat resembles *A. caricinus* F. Muell., but on such imperfect material it is impossible to reach any definite conclusion. I have also examined another duplicate of the Type collection located in the Institute de Botanique Systematique, Geneva, who received it from De Candolle's Herbarium in which were incorporated a number of duplicates from Preiss's collections in Western Australia. The ticket on the specimen reads "1831. *Amphipogon gracilis* Nees ab E., Swan River, Mr. Preiss, 1843." The term "Swan River" was, at the time of the collection, applied to the whole of the colony of Western Australia, and in spite of the absence of more precise detail as to the locality, I have no doubt that it is a part of the same collection. The specimen consists of some four culms with old heads on which the glumes are lacerated and all but three lemmas completely missing. Some leaves are present near the base of the culm, but the rhizome or rootstock is missing. The bristles of the lemma are broken and the cilia much damaged. The heads are short and rather dense, and the glumes too old to determine whether or not they were at one time ciliate. On the evidence available, I find it impossible to determine whether this represents a short-headed form of *A. caricinus* or a variety of *A. strictus* such as var. *breviseta*. *A. gracilis* is an older name than *A. caricinus,* and if synonymy could be established it would take priority. It would seem very undesirable, however, to replace a name which is well typified with one which can probably never be accurately typified. I propose, therefore, that this species should be regarded as a "Nomen dubium", and omitted from further considerations on the nomenclature of the genus.

Gamelythrum denudatum Nees ex Lehmann. Pl. Preiss., II (1846), 101. This species was described from a specimen with abortive spikelets only, viz., Perth, September, 1839, Herb. Preiss No. 1830. From the generic description of *Gamelythrum*, however, in which genus Nees unhesitatingly placed the species, it would seem extremely probable that his specimen is a form of *A. turbinatus* R. Br. In view of the inadequate nature of the Type material, however, some doubt must always remain as to its identity.

a 225615

New Species of Danthonia DC. (Gramineae) from Australia.

Joyce W. Vickery, M.Sc.

It is the intention of the writer to publish later in this series a revision of the Australian species of the genus *Danthonia*. The following new species are published now as a preliminary to this revision, and in order to facilitate the work of other students of the genus in Australia. The genus includes some of the more valuable of the native pasture grasses of the southern half of the continent on which pasture studies and strain selection work have been initiated at various field stations. Workers in that field are at present much hampered by the confusion in nomenclature which has existed in the genus, and by the lack of a comprehensive scheme of classification.

The present paper contains only the formal Latin descriptions and citation of the Holotypes, necessary to legitimize the names. English descriptions and detailed citation of the specimens examined will be published later.

The Holotypes are, except in one case, deposited in the National Herbarium of New South Wales. In citation of the specimens, the following abbreviations have been used to indicate the herbaria in which Holotype and duplicate specimens are located:—NSW. National Herbarium of New South Wales; MEL. National Herbarium, Melbourne; K. Herbarium of the Royal Botanic Gardens, Kew; JBC. The herbarium of Dr. J. B. Cleland, Adelaide.

D. acerosa n. sp.

Gramen erectum, caespitosum, usque ad 60 cm.; culmi aliquantum graciles, leves, interdum infra nodos tenuiter scaberuli, lucentes, pallidi vel purpurascentes, circa 3-nodes, nodis glabris; foliorum vaginae culmos amplectantes, tenuiter striatae, inter nervos scaberuli, aliter leves; ligula ciliata; laminae aliquantum tenues, involutae, saepe (in Typo) dense hirsutae pilis ad bases tuberculatis, interdum subglabrae, infra canaliculati, 5-15 cm. longae; paniculae exsertae, lucentes, plus minusve lanceolatae, laxae, rhachidis pedicellisque gracilibus scabro-pubescentibus vel pilosis; spiculae 3-6-(saepe 4-) flores, floribus quam glumis brevioribus aristas breve exsertas excludantibus; glumae plerumque purpurascentes, lucentes, angustissimae, tenues, in acuminibus longis diminuendes, 15-25 mm. longae, subaequales, 3-5-nerves, aliquandum micro-scaberulae praesertim in nervos; lemma gracilis, linearis, callo tenue plus 1 mm. longo, ad basem et infra sinum seriebus semmiannularibus pilorum, levis et glabra inter series, serie inferiore ad series superiorem plus minusve attingente, serie superiore usque 4 mm. longo; lemmati corpus circa 3.5 mm. longum callum includens, circa 0.75 mm. latum; lobi laterales circa 10.12 mm. longi, ad bases angusti et membranacei, post 3-5 mm. in setas capillares diminuendi; arista 13-18 mm. longa, ad basem fulva et contorta usque circa 6 mm.; palea angusto-oblonga vel linearis, paulo sinum excedens, circa 3 mm. longa, obtusa vel minute bifida in carinis minutissime ciliolatae, cetera glabra.

Holotype: Western Australia, Wooroloo, M. Koch No. 1826, 12.1907 (NSW. No. 2596). This species is known from about eighteen specimens chiefly collected in the Perth area or in other parts of south-western Western Australia.

D. alpicola n. sp.

Synonymy: *D. semiannularis* var. *alpina* Benth., Fl. Aust., VII (1878), 595.

Gramen erectum, perenne, glabrum, 10-30 cm. altum; culmi laevi, aliquanto rigidi, 3-4-nodi, nodis glabris, internodis saepe vaginis intectis; vaginae firmae, crassiusculae, laevae, supra aliquanto striatae, interdum purpurascentes, inferiores laxae; ligula minute ciliolata vel reductissima, interdum ad lateres pilis longis; laminae crassae, rigidae, plicatae vel involutae rare sub-planae et ad basem usque ad 4 mm. latae, glabrae, aliquanto pungento-cuspidatae apicibus carinatis, 5-10 cm. longae, infra laevae striataeque, supra tenuiter confertimque striatae; panicula haud vel breve exserta, contracta, densa, ovata vel ovato-lanceolata, 3-4 cm. x 2-2.5 cm., ramis laevis vel minute pubescentibus; spiculae purpurascentes, vel tandem stramineus, 4-6-flores, flosculis omnino quam glumas triente brevioribus praeter setas exsertas; glumae subaequales, acutae, anguste divergentes, 12-17 mm. longae, ca. 5-nervatae; lemma lineare-lanceolata; corpus lemmati callum breve pilosum includente ca. 3.5 mm. longum, supra callum et infra sinum pilosum seriebus duobus fasciculorum pilorum, marginibus pilosis, caetera plerumque laevum glabrumque, vel interdum in dorso pilis paucis distantibus; lobi laterales ad bases 3-5 mm. membranacei, in setis 3-5 mm. longis angustati; arista 10-17 mm. longa, ad basem 2-3 mm. torta, lobos laterales valde excedens; palea lineare-lanceolata, valde sinum excedens, 5.5-7 mm. longa, anguste truncata vel bifida, carinis firmis, in dorso glabra, supra in carinis minute ciliolata, infra medium inter carinis marginibusque pilis paucis longis; antherae flavae; caryopsis oblonga, ca. 2 mm. longa.

Lectotype: Victoria, Mount Buller, F. Mueller (MEL.; duplicate at K.). This species is known from about seven specimens collected at altitudes mostly over 4,500 feet on mountains in Victoria and southern New South Wales. It is characterised by its short dense panicle, and rather short, thick, rigid leaves.

D. Clelandii n. sp.

Gramen aliquantum robustum, dense caespitosum, perenne, ca. 75 cm. altum; culmi 3-4-nodes, plus minusve laeves vel infra paniculam scabri, nodis glabris; vaginae saepe quam internodis breves, tandem laxae, glabrae, laeves vel minute scaberulae; ligulae ciliis densis brevis ad 0.5 mm. longis reductae; laminae plus minusve setaceae vel laminae culmorum planae vel in sicco saepe involutae, 0.75-2.0 mm. latae, sensim acuminatae, ca. 30 cm. longae, infra plus minusve laeves, supra scabrae vel scabrido-pubescentes canaliculataeque; panicula multo exserta, folias excedens, 8-13 cm. longa, laxa, plus minusve patens, ramis remotis, spiculis paucis; rhachis scaber vel scabrido-pubescens, aliquantum angularis; spiculae flosculis paucis quam glumis brevibus; glumae 16-20 mm. longae, subaequales, sensim ad apicem anguste truncatum vel acutum angustatae, marginibus hyalinis manifestis, scaberulis, gluma inferior sub-9-nervata, superior sub-7-nervata; corpus lemmati 1 mm. callum includens 5 mm. longum, posteriore pilosum; lobi laterales 4 mm. setas includentes ca. 8 mm. longi, scaberuli, marginibus membranaceis ad setas sensim angustis; arista ca. 16 mm. longa, aliquantum valida, plus minusve tortilis supra infraque geniculum; palea ca. 8 mm. longa, sinum excedens sed quam lobis lateralibus brevis, apice bifida, carinis ciliatis, anguste oblanceolata membranacea sed infra aliquantum firma, infra pubescens; antherae 4-5 mm. longae, fulvo-rufae.

Holotype: South Australia, Upper Waterfall Gully, J. B. Cleland No. H.262, 30.10.1926 (NSW. No. 1126; duplicate at JBC.). This species is known from about thirteen specimens collected in the vicinity of the Mt. Lofty Ranges.

D. frigida n. sp.

Gramen robustum, dense caespitosum, glabrum, pallidoviride, perenne, saepe fasculis magnis 2-pedibus diametris inter saxa in montibus altis. Folia inferioria densa, vaginis latissimis, planis, crassis, manifeste striatis, vaginis senescentibus truncatis, lentis, saepe curvatis circa rhizoma robusta erecta et culmorum bases adherentibus. Culmi plerumque 2-3-pedes, saepe ad basem robusti, interdum plus minusve plani, 2-3-nodes supra bases, glabri, laeves, lucentes, striati, nodis glabris. Culmorum vaginae saepe internodos excedentes, laeves, striatae, diametris quam culmos excedentes, inferiores tandem laxae. Ligula ad cilia breves 0.5-1.5 mm. longa reducta. Foliorum inferiorem laminae circa 30-60 cm. longae, ad bases plus minusve planae, valde involutae in sicco, infra canaliculatae, supra profunde canaliculatae, rigidae, crassae, laeves margines remote scabras et inter canaliculis excludentes, ad bases 4-6 mm. latae, ad apices subulatos attenuatae. Culmorum laminae tenuiores, angustiores, saepe paniculas excedentes. Paniculae paullo contractae, multiflores sed vix densae, plus minusve lanceolatae, haud vel vix exsertae; rami prope bases divisi, hirsuti, saepe ad conjunctionem fasciculo pilorum longiorum. Spiculae pallidovirentes tandem stramineae, 4-8- (plerumque 5-7-) flores, flosculis glumas plerumque excedentibus, laxis; segmenti rhachillae 1-2 mm. longi. Glumae subaequales vel irregulariter inaequales, acutae vel anguste truncatae, firme membranaceae, laeves vel obscure microscaberulae, inferiore plerumque 1-nervata, superiore 3-5-nervata ad basem. Lemmati corpus 4-7 mm. longum callum 1 mm. longum dense pilosum includens, lanceolatum, in dorso plus minusve uniforme pilosum, pilis circa aequalis 0.75-1.5 mm. longis vix densis; lobi laterales plerumque lemmati corpora aequalans (circa 6 mm. longi), marginibus membranaceis, ad apices acuminatos setis brevibus 1-3 mm. longis attenuati, vel interdum (praesertim in flosculis superioribus) breviores acuti abrupte angustati ad setos breves; arista circa 8-15 mm. longa, lobos laterales excedens, geniculata, paullo vel validiore infra contorta et saepe fusca. Palea valde sinum excedens, quam lobas laterales brevior, circa 8 mm. longa, ad apicem bifida, linearis vel lineare-lanceolata, dorso plus minusve glabra sed in media inter carinas et margines dense pilosa, marginibus supra dense et tenuiter ciliolatis. Antherae circa 4 mm. longae rubro-flavidae.

Holotype: New South Wales, Mt. Kosciusko, about 6,000 feet, J. Vickery, 13.1.1940 (NSW. No. 1097). A species occurring at high elevations on the Australian Alps, both in New South Wales and Victoria. It has been generally referred to *D. robusta* F. Muell., but has been found not to agree with the type specimen of that species.

D. induta n. sp.

Gramen perenne, caepitosum, 75-120 cm. altum. Culmi laeves, aliquandum 2.5-3.5 mm. diametris, circa 4-nodes, internodis plerumque valde laminas excedentes. Vaginae glabrae. Ligula ad cilias breves densas reducta, saepe in marginibus pilis paucis longioribus. Laminae glabrae, planae vel laxe involutae, 1.5-4 mm. latae, usque 30 cm. longae, firmae, ad acumines tenues subulata attenuatae. Panicula valde exserta, laxe patens vel in sicco contracta et plus minusve lineare-lanceolata, 9-18 cm. longa, spiculis multis, ramis scaberulis. Spiculae plerumque 3-flores, floribus quam glumas manifeste brevioribus, remotiusculis. Glumae stramineae plerumque purpura virideque tinctae, prope bases latiores, ad acumines longiuscula attenuatae, subaequales vel irregulariter inaequales, 14-18 mm. longae, circa 5-7-nervatae, marginibus manifeste membranaceis. Lemmati corpus 4.5-5.5 mm. longum callum sub 2 mm. longum includens, pallidum, manifeste nervatum, pilis difusis instructum prope basem et in serie infra sinum densioris, pilis inferiores usque 2 mm. longis, pilorum seriebus superioribus circa 4-5 mm. longis; lobi laterales angusti, 7-9 mm. longi setas 1-3 mm. tenues includentes; arista lobos laterales valde excedens, circa 13-18 mm. longa, glumas breve sed manifeste excedens, praecox infra 4-6 mm. manifeste fulva contortaque. Palea circa 6-8 mm. longa, sinum valde excedens (usque ad 4 mm.), angustissimo-lanceolata, acuminate angustata, infra dorso et parte inter carinas marginesque hirsutis, supra tenuiter membranacea. Antherae rubro-flavidae, 2-3 mm. longa.

HOLOTYPE: New South Wales, Armidale, C. K. Ingram, 12.1938 (NSW. No. 1344). A species known from about seventeen specimens, mostly collected in north-eastern New South Wales and south-eastern Queensland.

D. laevis n. sp.

Gramen perenne, dense caespitosum, erectum, 20-60 cm. altum. Culmi 2-3 nodes, gracilis, laeves. Vaginae graciles, glabrae vel hirsutae pilis plus minusve appressis. Ligula ad ciliis minutis reducta, marginibus longe ciliatis. Laminae tenues, involuto-setaceae, rigidiusculae, acuminatae, usque ad 20 cm. longae, plus minusve glabrae vel hirsutae pilis ad bases tuberculatis plus minusve appressis. Paniculae valde exsertae, laminas excedentes, breves circa 3-4 cm. longae, laxe racemosae vel sparse ramosae, spiculis paucis (saepe circa 6), pedicillis tenuiter sed dense scaberulo-pubescentibus. Spiculae viridentes vel paullo purpurascentes, 4-6 flores, floribus quam glumas brevioribus. Glumae angustiusculae vel prope bases latiusculae, marginibus angustis membranaceis, acuminatae, 11-17 mm. longae, subaequales vel superior saepe inferiorem excedens, tenuiter et obscure nervatae. Lemma lanceolata vel angusto-lanceolata, serie densa pilorum longiusculorum infra sinum et fasciculis pilorum in marginibus supra callum et in callo, cetera dorso glabro laevi, lucenti; lemmati corpus circa 4 mm. longum 1 mm. callum includens, tenuiter induratum, nervatum; lobi laterales quam corpus bis longiores, ad bases latiusculi marginibus latis membranaceis, supra in setis brevibus (2-3 mm.) attenuati. Arista lobos laterales excedens, circa 11 mm. longa, pallido-fulva, infra semel vel bis laxe contorta, parte superiore rigidiusculo, quam partem inferiorem bis longiore. Palea sinum paullo vel valde excedens, saepe circa 5 mm. longa, firmiuscula, lanciolata vel oblanceolata vel sub-ovata, minute bifida, carinis supra minute scabro-pubescentibus. Antherae pallido-flavae. Caryopsis obovata, circa 2.5 mm. longa.

HOLOTYPE: Australian Capital Territory, Base of Mt. Stromlo, A. Melvaine, 26.4.1941 (NSW. No. 3232). This species is known chiefly from about twelve specimens collected on the Tablelands of New South Wales, but occurs also in Victoria and Tasmania.

D. Linkii var. **fulva** n. var.

Ab typo arista ad basem fulva et tortile usque ad 3-4 mm., arista et setis lateralibus saepe longioribus, glumis 12-17 mm. longis, panicula saepe elongata, laxaque, planta saepe robustiore et laminis latioribus variat.

HOLOTYPE: New South Wales, Flemington, G. B. Vickery, 31.3.1929 (NSW. No. 1573). A widespread variety known from over twenty localities in New South Wales and Victoria.

D. monticola n. sp.

Gramen perenne, dense caespitosum, usque ad 45 cm. altum; culmi laeves, plus minusve gracilis, 2-3 nodes; foliorum vaginae quam internodis breviores, graciles, hirsutae pilis brevibus; ligula breve ciliata; laminae involuto-setaceae, tenues, firmae, hirsutae pilis brevibus saepe appressis diffusis, usque ad 15 cm. longae, quam culmis breviores; panicula lanceolata vel ovata, multo exserta, contracta vel ad racemum reducta, 5-15 spiculis, ramis pubescentibus vel pilosis; spiculae purpurascentes vel tandem straminea, 4-6 florae; flosculi quam glumis multo breviores; glumae 8-11 mm. longae, infra media lateriores, acuminatae, subaequales, ca. 9-nerves, marginibus aliquantum firmis, purpurascentibus, microscaberulis; lemma plus minusve ovato-lanceolatum, seriibus duobus pilorum, posteriore laevis lucidumque vel pilis paucis diffusis, serie inferiore basem seriis superioris attingente, serie superiore, pilorum usque ad. 3 mm. longorum manifeste infra sinum disposito; corpus lemmatis 1 mm. callum includens ca. 2 mm. longum; lobi laterales angustiusculi, triangulares, marginibus exterioribus membranaceis, in setis tenuibus angustati, setis inclusis 7-8 mm. longi; arista breve sed manifeste lobos laterales, columna fulva tortilique; palea obovato-spathulata vel obovato-oblonga, obtusissima, minute bifida, supra in carinis minutissime ciliolata, interdum posteriore infra sparse hirsuta, sinum excedens; antherae flavae, ca 1 mm. longae; caryopsis obovata, ca. 1.5 mm. longa. 1 mm. lata.

HOLOTYPE: New South Wales, Lithgow, J. Vickery, 2.1.1936 (NSW. No. 1359). This species has been collected in about fourteen localities in New South Wales, chiefly on the Tablelands.

D. nivicola n. sp.

Gramen parvum, erectum, caespitosum, perenne, ca. 20 cm. altum, rhizomate breve sub-erecto; culmi laevi, gracilissimi, ca. 2-3-nodi, nodis glabris; vaginae laevae vel inferiores squamiformae interdum ad nervos pubescentes; ligula obscura, minute ciliata; laminae tenues, setaceae, tecte involutae, usque ad 10 cm. longae, laevae vel interdum ad faciem interiorem pilis paucis; panicula valde exserta, parva, ca. 2-3 cm. longa, subracemosa, floribus paucis; spiculae, ca 8 mm. longae, plerumque 4-flores, pedicellatae; glumae plerumque purpurascentes, flosculos paulum excedentes, lanceolatae, acutae vel acuminatae, supra paulo carinatae, plus minusve laevae vel in marginibus minute ciliolatae et in carinis ad apices minute et distante scabridae, nervis obscuris, inferior superiorem paulo excedens; lemma supra medium 2-lobata, arista media lobos breve excedenti, 3-4 mm. longa setos excludens, obscure 3-nervata, in dorso laeva nisi ad basem pilis paucis sparsis et fasciculis parvis duobus ad sinum et ad quisque marginem, et fasciculo ad callum; lobi acuti vel breve acuminati, haud vel vix aristati, in marginibus ciliolati; palea longa, lobos laterales subaequalans, in marginibus ciliolata, truncato-obtusa vel minute bifida; antherae 3, ca. 1 mm. longae, inter loculos profunde divisae.

HOLOTYPE: New South Wales, Mt. Kosciusko, alt. 6,000 feet, J. Vickery, 14.1.1940 (NSW. No. 1110; duplicate at CAN., K.).

Danthonia pauciflora? var. *alpina* F. Muell. ex Benth. (Fl. Aust., VII, 1878, 596) is identical with this species. The varietal epithet cannot be used in specific rank as the name is pre-occupied. *D. nivicola* has been figured by Maiden in the Agricultural Gazette of N.S.W., XII (1901), 477 under the name of *D. pauciflora*, a distinct species.

D. nivicola is abundant in grasslands at high altitudes on the Australian Alps in New South Wales and Victoria, where it is often found associated with *D. nudiflora* Morris.

D. occidentalis n. sp.

Gramen perenne, erectum, caespitosum, 25-60 cm. altum, saepe in locis arenaceis habitans; culmi gracillimi, laevi, leviter striati, glabri, sed infra paniculam pubescentes vel pilosi, 3-4-nodi, nodis glabris, internodis vaginas valde excedentibus;

vaginae striatae, laevae; lingula manifeste longo-ciliatae; laminae involutae, subglabrae vel leviter vel dense hirsutae, 5-30 cm. longae, paullo tenues, striatae; panicula plerumque valde exserta, contracta, densuiscula, lanceolata val lato-lanceolata, virescens vel purpurascens, ramis pedicellisque piloso-pubescentibus, infra spiculas pilorum fasciculis; spiculae 3-4-flores, flosculis laxis, sine setis exsertis quam glumas ca. duplo brevioribus; glumae subaequales vel inferior paullo superiorem excedens, 16-22 mm. longae, angustissimae, marginibus membranaceis angustissimis, acuminatae apicibus setaceis, infra latiores, divergentes, ad bases plerumque 5-7-nervatae; lemma angusta, linearis callo aliquanto longo (ca. 1-5 mm.), angusto, piloso; corpus lemmati callum includens 4-4.5 mm. longum, plus minus in dorso uniforme pilosum pilis brevibus, infra sinum seriebus pilorum longorum (3-4 mm.); lobi laterales angusti, 7-10 mm. longi, ad bases plani et membranacei, ad setis tenuibus partes inferiores plus minusve aequalantibus; arista ad basem 4-6 mm. fulva et torta, supra fusca et reflexa, in toto 12-17 mm. longa, lobos laterales valde excedens; palea angusto-lanceolata, sinum valde excedens, anguste truncata vel bifida, ad margines supra medium minute ciliolata, in dorso subglabra vel pilosa et inter carinis marginibusque pilis distantis; caryopsis oblonga, ca. 2 mm. x 0.6 mm.

HOLOTYPE: Western Australia, Karrakatta (Perth district), ex herb. W. V. Fitzgerald, 11.1900 (NSW. No. 4389; duplicate at K.).

D. purpurascens n. sp.

Gramen perenne, erectum, caespitosum, 30-90 cm. altum; culmi laeves, folia multo excedentes, 3-4-nodes, internodis vaginas excedentibus; foliorum vaginae glabrae vel manifeste hirsutae ad bases tuberculatis pilis praesertim inter nerves, superiores plerumque subglabrae, aliquantum striatae, saepe scaberulae inter nerves, tandem laxae; ligula breve ciliata, ad margines et collum pilis longis; laminae planae saltem base vel laxe involutae, 1-3 mm. latae, usque ad 20 cm. longae, firmae sed haud rigidae, glabrae vel manifeste hirsutae; panicula multo exserta, laxa vel in sicco aliquantum contracta, linearis vel lanceolata vel lanceolato-ovata, 5-30 (saepe 10) cm. longa, plerumque spiculis numerosis, raro paucis, ramis usque ad 4 cm. longis scabris vel scabro-pubescentibus, aliquantum distante et inaequaliter hirsutis pilis longioribus infra spiculas; spiculae viridescentes vel paullo purpurascentes, tandem stramineae, 4-6-flores, flosculis quam glumis multo brevioribus; glumae firmae marginibus firme membranaceis plerumque purpurascentibus, 10-17 mm. longae, subaequales, infra medium latiusculae, ad apices sensim angustatae, in nervis scaberulae, interdum carinis supra scabridis, plerumque 5-nerves; lemma lanceolata; corpus lemmati callum 1-1.5 pilosum includens ca. 3.5 mm., seriibus duobus pilorum, serie inferiore posteriorem laevem lucidum excedente, superiore usque ad 5 mm. longo paullo infra sinum disposito; lobi laterales 7-10 mm. longi in toto, infra planae marginibus angustis membranaceis in setis aequilongis vel brevioribus angustatae; arista ca. 9-15 mm. longa, setas laterales breve excedens, ex base 2-3 mm. geniculata, columna fusca et semel vel bis tortili, aliquantum a latere glumarum exserta sed non vel brevissime longitudine glumas excedens; palea oblanceolata vel elliptica, manifeste sinum excedens, apice anguste truncata vel minute fifida, marginibus minute ciliolatis, infra pilis tenuibus in posteriore et inter carinas marginesque hirsuta; antherae 1-1.5 mm. longae, rufo-flavae; caryopsis ca. 2 mm. longa, oblanceolata vel anguste obovata.

HOLOTYPE: New South Wales, Hornsby, W. F. Blakely, 10.1914 (NSW. No. 808). This species occurs very plentifully on the tableland and coastal districts of New South Wales. It is also present in south-eastern Queensland, and, more rarely, in Victoria and South Australia.

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The Correct Name of Sturt's Desert Pea, Clianthus formosus (G. Don) comb. nov.

By Neridah Ford, B.Sc., and Joyce W. Vickery, M.Sc.

"Sturt's Desert Pea" was first collected in Australia by Dampier during his voyage of 1699, and in his "Voyage to New Holland," published in 1703-6, it was described and figured by Dr. John Woodward under the name of *Colutea Novae Hollandiae* (see Walpers, Ann. Bot. Syst., II (1851-2), 368; Osborn and Gardner, Proc. Linn. Soc., 151st session (1939), 44; Osborn, Aust. Journ. Sci. I, No. 6 (1939), 194). Although this is the first name to be used it predates the starting point for botanical nomenclature (1753), and so does not enter into priority considerations.

In 1832, G. Don, in Gen. Syst., II, p. 468, described two specimens of the "Desert Pea" from New Holland under the names *Donia speciosa* and *Donia formosa*. The type of the former came from Regent's Lake and was doubtless a specimen collected by Alan Cunningham, who accompanied Oxley on his first expedition into the interior of N.S.W. The type of the latter was from the North-west coast of New Holland, collected by Captain King at the Curlew River.

In 1835 Alan Cunningham apud Lindley, Trans. Hort. Soc. Lond., 2nd ser., I (1835), described *Clianthus Oxleyi* based on *Donia speciosa* G. Don and mentioning the same type, that from Regent's Lake collected on Oxley's first expedition, and *Clianthus Dampieri* based on *Donia formosa* G. Don, and referring to *Colutea Novae Hollandiae* of Woodward and to specimens collected by Dampier in north-west Australia and by himself on one of the islands of Dampier's Archipelago.

Although under the principles guiding botanical nomenclature during the last century Cunningham was probably entitled to supply new specific epithets when transferring the species to the genus *Clianthus*, under the present International Rules this is not permissible and the earlier epithets must be restored in so far as they may be applicable.

In the Botanical Appendix, p. 71, to Sturt's Central Australia, vol. 2 (1849), Robert Brown discusses the two forms of the "Desert Pea" which had been recognised, both by G. Don and by Cunningham and concludes that the two are conspecific. Australian botanists would appear to be in complete agreement with this conclusion. The points of difference enumerated by Don, viz., leaves lanceolate, acute; flowers umbellate, in *Donia speciosa*, and leaves obovate; flowers racemose, in *Donia formosa* do not appear to be at all significant in this species, as considerable variation is found in these characters.

For over half a century after Robert Brown's comments the "Desert Pea" appears to have been known as *C. Dampieri* A. Cunn. (*vide* Bentham, Flora Aust., II (1864), 214; Moore & Betche, Handbook of Fl. of N.S.W., (1893), 149; F. Mueller, Syst. Census of Aust. Plants, Part I (1882), 39; Bailey, Queensland Flora, Part II (1900), 399; Bailey, Comp. Catalogue of Queensland Plants (1909), 138; Ewart and Davies, Flora of the Northern Territory, (1917), 148; Gard. Chron., vol. CI, 3rd series, No. 2627 (1937), 286 and vol. CV, 3rd series, No. 2736 (1939), 352.

In 1909 Ascherson and Graebner restored the earlier epithet of Don and effected the combination *C. speciosus* (Don) Aschers. and Graebn. Their name appears to have come into general use in Australian literature during the last twenty years (*vide* Black, Fl. S.A., Part II (1924), 317; Gardner, Enum. Pl. Aust. Occ., (1931), 64; Osborn, Aust. Journ. of Science, I, No. 6 (1939), 194; Lothian, Vic. Nat., LVII, No. 4 (1940), 88).

However *C. speciosus* (Don) Aschers. and Graebner is a later homonym of *C. speciosus* Steud. (1840-41) which is a synonym of *Streblorrhiza speciosa* Endl. and the epithet "speciosus" cannot therefore again be used in the genus *Clianthus*.

Donia formosa G. Don was published at the same time as *D. speciosa* G. Don. Although conspecific it was based on a separate type, and regarded as a distinct species by the author. Therefore it was not a superfluous name at the time of publication, and under Art. 60 of the International Rules (see also amendments passed at the Congress of 1935, published in Brittonia, VI (1947), 22) it is available for use, and must be taken into consideration for purposes of priority. As it is older than either of Cunningham's names, and there is no hindrance to its use in the genus *Clianthus,* it is now necessary therefore to effect the combination *C. formosus* (G. Don) comb. nov. based on *Donia formosa* G. Don.

The synonymy of the species may be summarised as follows:—

Clianthus formosus (G. Don) comb. nov.

Donia formosa G. Don, Gen. Syst., II (1832) 468.

Donia speciosa G. Don l.c.

Colutea Novae Hollandiae, Woodward in Dampier, Voy., III (1703), 111, t. 4, f. 2.

Clianthus Dampieri A. Cunn. apud Lindl., in Trans. Hort. Soc. Lond., 2nd ser., I (1835) 522.

Clianthus Oxleyi A. Cunn. apud Lindl., l.c.

Clianthus speciosus (G. Don) Aschers. and Graebn., Syn. Mitteleur. Fl., VI (1909), 725, non Steud. (1840-41).

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The Schlechter Collection of Orchidaceae in the National Herbarium of New South Wales.

By the Rev. H. M. R. Rupp, B.A.

The late Dr. R. S. Rogers, in his Presidential Address to the Botany Section of the Australian and New Zealand Association for the Advancement of Science (Sydney Meeting, August, 1932), said of Rudolph Schlechter; "Judged by achievement and by his vast and varied experience, he is entitled to rank as a very great botanist, and the greatest of all orchidologists." Schlechter was undoubtedly a very remarkable man, who probably wore himself out prematurely by his achievements, for he died in 1925 at the comparatively early age of 52. He visited Sydney about forty years ago; but Australia seems to have been one of the few countries of the world which he did not explore in search of plants. To relate his accomplishments in this connection would be going far beyond the scope of this paper. His travels were amazing; and no regions were too wild or remote from civilization for him to penetrate, whether they lay in South America, Africa, Asia, or the islands of the Malay Archipelago and the South Pacific. His publications were commensurate with his travels. Volume after volume poured from his pen, and in various scientific journals he produced more than 400 papers and articles on botanical subjects. But however he may rank as a general botanist, it is, as Rogers suggests, in the field of orchidology that his reputation stands highest. To illustrate this, mention may be made of his work in the territory formerly known as German New Guinea. He visited this area twice between 1901 and 1909, and as a result of his labours the number of orchid species recorded there was raised from 75 to 1,450.

The greater part of Schlechter's immense herbarium of orchids was deposited in the Berlin Museum, where he became Keeper of Botany. Unhappily for all concerned, this magnificent treasury of botanical science was terribly damaged, and partly destroyed, in the great war of 1939-45. At present it is uncertain whether the types of Schlechter's orchid species, amounting literally to thousands in number, have been lost to us for ever, or whether some at least were removed and stored away. To what extent he distributed duplicates from the collections made on his numerous expeditions, I do not know. But the National Herbarium of New South Wales possesses nearly 400, and in view of their enhanced value since the disaster to the Berlin Museum, it is considered that they should be catalogued and published for the benefit of botanical circles, through the medium of some recognised periodical scientific journal. This is the purpose of the present paper. It is not known how the majority of these specimens came into the possession of the Sydney Herbarium. About thirty of those from South Africa are labelled by the University of Zurich, and presumably these came by way of exchange; but the great majority bear Schlechter's own labels. All belong to the period covered by the first twenty years of the present century. By far the largest group in the collection is that comprising specimens from what we now know as the Mandated Territory of New Guinea, usually called by Schlechter Kaiser Wilhelmsland. In addition to these there are specimens from New Caledonia, Celebes and Borneo, Sumatra, and South Africa.

As Schlechter himself was the author of so many of the species listed below, the letter S. is used throughout for his name. For the names of other authors, the abbreviations used are those generally recognised; J. J. Sm. for J. J. Smith, Lindl. for Lindley, and so on. For the sake of convenience, the names of genera and species are given in alphabetical order.

I. New Guinea.

ACANTHEPHIPPIUM
- papuanum S.

AGROSTOPHYLLUM
- dolichophyllum S.

APPENDICULA
- dendrobioides S.
- infundibuliformis J. J. Sm.

BULBOPHYLLUM
- fractiflexum J. J. Sm.
- fruticiculum S.
- melinanthum S.
- oxyanthum S.

CADETIA
- bigibba S.
- chamaephyton S.
- chionantha S.
- collina S.
- crenulata S.
- dischorensis S.
- echinocarpa S.
- imitans S.
- obliqua S.
- potamophila S.
- quinqueloba S.
- stenocentrum S.
- Takadui S.
- trigonocarpa S.
- Wariana S.

CALANTHE
- aceras S.
- cruciata S.
- Engleriana Kranzl.
- inflata S.
- kaniensis S.

CALYMMANTHERA
- montana S.
- tenuis S.

CERATOSTYLIS
- scirpoides S.

CHAMAEANTHUS
- gracilis S.

CLADERIA
- papuana S.

COELOGYNE
- Beccarii Rchb. f.
- Blitohii S.
- fragrans S.
- pustulosa Riall.
- Weibohii S.

CORYBAS
- gastrosiphon S.

CRYPTOSTYLIS
- fulva S.

CYSTORCHIS
- dentifera S.

DENDROBIUM
- abbreviatum S.
- aberrans S.
- acianthum S.
- acutilobum S.
- aemulans S.
- altigenum S.
- angraecifolium S.
- apertum S.
- appendicula S.
- auricolor J. J. Sm.
- axillare S.
- bifalce Lindl.
- bismarckiense S.
- brevilabium S.
- cadetioides S.
- capituliflorum Rolfe.
- chloroleucum S.
- chrysotaenium S.
- chrysotropis S.
- clausum S.
- collinum J. J. Sm.
- Cuthbertsonii F. Muell.
- cyanocentrum S.
- cyclobulbon S.
- decumbens S.
- difamuense S.
- disoides S.
- dryadum S.
- eximium S.
- fariniferum S.
- Forbesii Riall.

DENDROBIUM—*continued.*
fornicatum S.
frigidum S.
gatiense S.
gazellae Kranzl.
glebulosum S.
globiflorum S.
grossum S.
guttulatum S.
hamadryas S.
herpetophytum S.
hippocrepiferum S.
Hollrungii Kranzl.
hymenocentrum S.
inaequale Rolfe.
insigne Rchb. f.
Johnsoniae F. Muell.
Koordersii J. J. Sm.
lamproglossum S.
Lawesii F. Muell.
leucohybos S.
leucorhodum S.
litorale S.
Loesenerianum S.
lucidum S.
macrophyllum A. Rich.
macrum S.
meliodorum S.
minjemense S.
Mirbelianum Gaud.
mischobulbon S.
musciferum S.
nardoides S.
neuroglossum S.
Novae-Hibernae Kranzl.
obliquum S.
obovatum S.
odontopus S.
oreodoxum S.
oreogenum S.
paludiculum S.
parvulum Rolfe.
pentapterum S.
perlongum S.
petiolatum S.
phlox S.
piestocaulon S.
pluricostatum S.
pleurodes S.
polyschistum S.
poneroides S.
potamophilum S.

DENDROBIUM—*continued.*
prosteciglossum S.
pseudocalceolum J. J. Sm.
pumilio S.
puniceum Ridl.
quadriferum S.
regale S.
rhipidolobum S.
rhytidothecum S.
roseoflavidum S.
rubropictum S.
salmoneum S.
sarcodes S.
sarcophyllum S.
scarlatinum S.
scopulum S.
setosum S.
Smilliae F. Muell.
spectabile Miq.
subpetiolatum S.
subsessile S.
theionanthum S.
toricellense S.
trachyrhizum S.
triste S.
undatialatum S.
violaceo-pictum S.
Warianum S.
xanthocaulon S.

DISPERIS
rhodoneuron S.

EPIPOGUM
roseum (D. Don) Lindl.

ERIA
bracteata S.
collina S.
cordifera S.
diphylla S.
iodantha S.
Micholitzii Kranzl.
ramuana S.
rhodoleuca S.
truncicola S.

ERYTHRODES
papuana S.

EULOPHIA
imperatifolia S.
macrorhiza Blume.
venosa R. Br.

I. New Guinea—*continued.*

EURYCENTRUM
obscurum S.
monticolum S.

GALEOLA
montigena S.

GEODORUM
pictum Lindl.

GLOSSORHYNCHA
hamadryas S.
squamulosa S.

GOODYERA
erythrodioides S.
rubicunda S.

HABENARIA
chloroleuca S.
nana S.
pachyneura S.
papuana S.

HETAERIA
Erimae S.

HIPPEOPHYLLUM
micranthum S.

HYLOPHILA
orientalis S.

LECANORCHIS
papuana S.

LECTANDRA
podochiloides S.

LEPIDOGYNE
sceptrum S.

LIPARIS
acaulis S.
altigena S.
anemophila S.
apiculata S.
calcaria S.
caricifolia S.
chlorantha S.
cyclostele S.
dolichobulbon S.
graciliscapa S.
imperatifolia S.
lamproglossa S.
leptopus S.
mapanifolia S.
melanoglossa S.
microblepharon S.

LIPARIS—*continued.*
nebuligena S.
neoguineensis S.
ochrantha S.
ovalis S.
persimilis S.
schistochila S.
spectabilis S.
stenostachya S.
sympodialis S.
trachyglossa S.
truncicola S.

LUISIA
Beccarii Rchb. f.
teretifolia Gaud.

MACODES
dendrophila S.
Sanderiana Rolfe.

MALLEOLA
microphyton S.
palustris J. J. Sm.
Wariana S.

MICROSTYLIS
arachnoides S.

NERVILIA
aragoana Gaud.
campestris S.
crispata S.
porphyrophylla S.

PAPHIOPEDILUM
violascens S.

PHAJUS
montanus S.

PHALAENOPSIS
amabilis Blume.

PHOLIDOTA
imbricata Lindl.

PHREATIA
brachystachys S.
petiolata S.

PLATYLEPIS
lamellata S.

PLOCOGLOTTIS
maculata S.
papuana S.
pseudomoluccana S.
sakiensis S.

I. New Guinea—*continued.*

PODOCHILUS
- dendrobioides S.
- imitans S.
- polytrichoides S.
- scalpelliformis Blume.

POMATOCALPA
- lasioglossum S.
- marsupiale (Kranzl.) S.
- potamophilum S.

PSEUDERIA
- floribunda S.
- pauciflora S.
- Wariana S.

ROBIQUETIA
- gracilistipes (S.) J. J. Sm.
- Mooreana (Rolfe) J. J. Sm.

SARCOCHILUS
- chrysanthus S.
- Moorei S.
- odoratus S.

SCHOENORCHIS
- densiflora S.

SPATHOGLOTTIS
- grandifolia S.
- parviflora Kranzl.
- portus Finchii Kranzl.

TAENIOPHYLLUM
- clavatum S.
- grandiflorum S.

TAENIOPHYLLUM—*continued.*
- kaniense S.
- macranthum S.
- pulucarpum S.
- quaquaversum S.

THRIXSPERMUM
- collinum S.

TRICHOGLOTTIS
- papuana S.
- sororia S.

TROPIDIA
- acuminata S.
- disticha S.
- gracilis S.

VANDA
- Hindsii Lindl.

VANDOPSIS
- longicaulis S.

VRYDAGZYNIA
- novaguineensis S.
- rivularis S.
- Schumanniana Kranzl.

ZEUXINE
- atrorubens S.
- dipera S.
- Erimae S.
- toricellensis S.

II. New Caledonia.

BULBOPHYLLUM
- Finetianum S.
- neocaledonicum S.
- polypodioides S.

CALADENIA
- alba R. Br.

CERATOSTYLIS
- micrantha S.

DENDROBIUM
- crispatum Sw.
- cymatolegnum S.
- eleutheroglossum S.
- Finetianum S.
- pectinatum Finet.

DIPODIUM
- squamatum R. Br.

EARINA
- Deplanchei Rchb. f.

ERIA
- karikouyensis S.

ERIAXIS
- rigida Rchb. f.

GONATOSTYLIS
- Vieillardii S.

LIPARIS
- disticha Lindl.
- laxa S.

LYPERANTHUS
- latilabris S.

II. New Caledonia—*continued.*

MEGASTYLIS
- gigas S.

MICROSTYLIS
- taurina Rchb. f.

MICROTATORCHIS
- fasciola S.

MICROTIS
- aemula S.

OBERONIA
- neocaledonica S.

PHREATIA
- hypsorrhynchos S.
- macrophylla S.
- neocaledonica S.
- oubatchensis S.

PODOCHILUS
- Vieillardii (Rchb. f.) S.

THELYMITRA
- longifolia Forst.

ZEUXINE
- Vieillardii S.

III. Celebes and Borneo.

ADENONCOS
- celebicus S.
- nasonioides S.

BULBOPHYLLUM
- corticola S.
- longerepens S.
- masarangicum S.
- mutabile Zoll.
- Odoardii Pfitz.
- pachyneuron S.
- perpendiculare S.

CALANTHE
- celebica Rolfe

CERATOSTYLIS
- vagans S.

COELOGYNE
- rhizomatosa J. J. Sm.

CYSTORCHIS
- celebica S.

DENDROBIUM
- chrysotaenium S.
- confusum S.
- cuneilabrum J. J. Sm.
- furcatum Reinw.
- lockhartioides S.
- macropterum Kranzl.
- odoratum S.
- parvulum Rolfe.
- Smithianum S.
- speculigerum S.

ERIA
- decipiens S.

HIPPEOPHYLLUM
- celebicum S.

LIPARIS
- celebica S.

MICROSTYLIS
- nigrescens J. J. Sm.
- repens Rolfe.

OBERONIA
- masarangica S.
- pleistophylla S.

PHREATIA
- Koordersii Rolfe.

PODOCHILUS
- anceps (Blume) S.
- curviunguis S.
- reflexus S.

SACCOLABIUM
- celebicum S.

SARCANTHUS
- bilamellatus J. J. Sm.

SARCOSTOMA
- celebicum S.

THRIXSPERMUM
- tylophorum S.

TRICHOGLOTTIS
- Koordersii Rolfe.

VANDA
- arcuata J. J. Sm.

VRYDAGZYNIA
- celebica S.

IV. Sumatra.

- AGROSTOPHYLLUM
  - trifidum S.
- BULBOPHYLLUM
  - Smithianum S.
  - xanthanthum S.
- CYSTORCHIS
  - Castellayana S.
- DENDROBIUM
  - carnosum Rchb. f.
  - clavipes Hook. f.
  - isomerum S.
  - linearifolium Teys. & Binn.
- ERIA
  - cylindrolobus S.
  - lasiorhiza S.
  - padangensis S.
- GALEOLA
  - pterospermum S.
- LIPARIS
  - caespitosa Lindl.
  - lepanthes S.
- MALLEOLA
  - Witteana S. & J. J. Sm.
- MICROSTYLIS
  - chamaeorchis S.
- OBERONIA
  - Costeriana J. J. Sm.
  - merapiensis S.
- OXYANTHERA
  - micrantha Brongn.
- PHREATIA
  - secunda Lindl.
- PODOCHILUS
  - rubens S.
- TAENIOPHYLLUM
  - rubrum Ridl.
- THRIXSPERMUM
  - album (Ridl.) S.
  - Krauseanum S.

V. South Africa.

- ACROLOPHIA
  - tristis Bol. & S.
- CERATANDRA
  - bicolor Sond.
- CORYCIUM
  - orobanchoides Sw.
- DISA
  - caulescens Lindl.
  - filicornis Thunb.
  - glandulosa Burch.
  - lacera Sw.
  - Marlothii Bol.
  - sagittalis Sw.
  - schizodioides Sond.
  - stachyoides Rchb. f.
  - tenella Sw.
  - tripetaloides N. E. Br.
  - uncinata Bol.
- DISPERIS
  - aemula S.
  - anthoceros Rchb. f.
  - Fanniniae Harv.
  - villosa Sw.
- EULOPHIA
  - aemula S.
  - leontoglossa Rchb. f.
  - litoralis S.
- HABENARIA
  - clavata Lindl.
  - malaccophylla Rchb. f.
  - natalensis Rchb. f.
  - occultans Welw.
  - tetrapetala Sond.
  - tetrapetaloides S.
- HOLTHRIX
  - aspera Rchb. f.
  - orthoceras Rchb. f.
  - villosa Lindl.
- MONADENIA
  - multiflora Bol.
  - tenuis Kranzl.
- NEOBOLUSIA
  - Tysonii S.
- PLATANTHERA
  - Zeyheri (Steud.) S.

NATIONAL HERBARIUM
South Yarra
S.E.1
VICTORIA

V. South Africa—*continued.*

PTERYGODIUM
- alatum Sw.
- catholicum Sw.
- platypetalum Lindl.
- volucris Sw.

SATYRIUM
- bracteatum Thunb.
- emarcidum Bol.
- humile Lindl.

SATYRIUM—*continued.*
- outeniquense S.
- retusum Lindl.
- rhynchanthum Bol.

SCHIZODIUM
- clavigerum Lindl.

ZEUXINE
- cochlearis S.

Sydney: Alfred Henry Pettifer, Government Printer—1950

a 225618

South Yarra
S.E. 1
of Victoria

Microstrobos, a New Name for a Podocarpaceous Genus.

Joy Garden, B.Sc.Agr. and L. A. S. Johnson, B.Sc.

J. D. Hooker (1860) gives an account of the confusion which existed at that time between three Tasmanian coniferous genera. This may be summarised as follows:

W. J. Hooker (1843) described the species *Athrotaxis tetragona* Hook. (as "*Arthrotaxis*") from male material only.

J. D. Hooker (1845), on receiving further male material of *A. tetragona* Hook. together with female material which he erroneously believed to be conspecific therewith, transferred this species to a new genus, *Microcachrys* Hook. f., as *M. tetragona* (Hook.) Hook. f.

Archer (1850) described the true female plant of *A. tetragona* Hook. as *Pherosphaera Hookeriana* Archer, the only species of the new genus *Pherosphaera* Archer. He mistakenly applied the name "*Microcachrys tetragona* Hook. fil." to a third plant not previously described. This plant was described by J. D. Hooker (1860) as *Diselma Archeri* Hook. f., the only species of the new genus *Diselma* Hook. f.

J. D. Hooker (1860) was the first botanist to match correctly the male and female plants of each of these three species and to attempt to clarify the nomenclature. However, whereas he correctly applied the names *Microcachrys* Hook. f. and *M. tetragona* (Hook.) Hook. f. and described *Diselma* Hook. f. and *D. Archeri* Hook. f. as new, he transferred the names "*Pherosphaera* Archer" and "*P. Hookeriana* Archer" to the third genus and species (previously incorrectly referred to *Microcachrys tetragona* ♀ by Hooker (1845)). This procedure is, of course, contrary to the International Rules of Botanical Nomenclature and *Pherosphaera* Archer and *P. Hookeriana* Archer must fall as synonyms of *Microcachrys* Hook. f. and *M. tetragona* (Hook.) Hook. f. respectively. Consequently this third genus and species require new names, and a new combination is required for the New South Wales species *Pherosphaera Fitzgeraldi* (F. Muell.) F. Muell. ex Hook. f. For the genus the name *Microstrobos* (Greek μικρος *small,* and στροβος *a top* or *cone*) is proposed. The name *M. niphophilus* (*snow-loving*) is proposed for the species which has been known incorrectly as *Pherosphaera Hookeriana,* and this is selected as the type species of *Microstrobos.*

The synonymy of the genera and species concerned is as follows:

PODOCARPACEAE

1. **Microcachrys** Hook. f. in Lond. Journ. Bot. IV (1845) 149.
Pherosphaera Archer in Hook. Journ. Bot. II (1850) 52.

M. tetragona (Hook.) Hook. f., l.c. (Holotype: Tasmania, Gunn "No. 369," 1833 (according to Hook. f. (1860) this should be Gunn No. 367)).

Arthrotaxis tetragona Hook., Ic. Pl. (1843) t. 560 (basonym).
Pherosphaera Hookeriana Archer in Hook. Journ. Bot. II (18~~47~~50) 52.

2. **Microstrobos** Garden et Johnson, gen. nov.

"Pherosphaera Archer" Hook. f., Fl. Tasm. I (1860) 355, t. 99, non *Pherosphaera* Archer, sensu orig. (TYPE SPECIES: *M. niphophilus* Garden et Johnson).

M. niphophilus Garden et Johnson, sp. nov.

"Pherosphaera Hookeriana Archer" Hook. f., l.c., non *P. Hookeriana* Archer, sensu orig. (HOLOTYPE: Mountains near Lake St. Clair, R. C. Gunn. (? No. 366 partim), "Fl. Jan."—in herb. Kew. (not seen)).

M. Fitzgeraldi (F. Muell.) Garden et Johnson, comb. nov.

Dacrydium Fitzgeraldi F. Muell., Fragm. Phytogr. Austral. IX (1880) 102 (basonym).

Pherosphaera Fitzgeraldi (F. Muell.) F. Muell. ex Hook. f. in Hook. Ic. Pl. XIV (1882) t. 1883.

CUPRESSACEAE

3. **Diselma** Hook. f., Fl. Tasm. I (1860) 353, t. 98.

D. Archeri Hook. f., l.c.

Fitzroya Archeri (Hook. f.) Benth. in Benth. et Hook. f., Gen. Pl. III (1880) 426.

It is appropriate to mention here that the correct name for the "Celery-top Pine" of Tasmania is *Phyllocladus aspleniifolius* (Labill.) Hook. f., not *P. rhomboidalis* L. C. Rich., although it is still commonly known by the latter name. When publishing the combination *P. aspleniifolius* (*"aspleniifolia"*) J. D. Hooker (1845) attributed it to Richard; this was an error and later (J. D. Hooker 1860) he cited the name as *"P. aspleniifolia* Nob." (i.e "Hook. f."). Therefore it does not seem advisable to credit the combination to "L. C. Rich. ex Hook. f."

Phyllocladus aspleniifolius (Labill.) Hook. f. in Lond. Journ. Bot. IV (1845) 151.

Podocarpus aspleniifolia Labill., Pl. Nov. Holl. II (1806) 71, t. 221 (basonym).

Phyllocladus Billardieri Mirb. in Mém. Mus. Par. XIII (1825) 76.

Phyllocladus rhomboidalis L. C. Rich., Conif. (1826) 130, t. 3, f. 2.

Thalamia aspleniifolia (Labill.) Spreng., Syst. Veg. III (1826) 890.

LITERATURE CITED.

Archer, W. (1850).—Note on *Microcachrys,* Hook. fil., and on a new allied genus of Coniferae of Van Diemen's Land. Hook. Journ. Bot. 2: 51-52.

Hooker, J. D. (1845).—On the Huon Pine, and on *Microcachrys,* a new genus of Coniferae from Tasmania. Lond. Journ. Bot. IV: 137-157.

——— (1860).—Flora Tasmaniae I: 349-359.

Hooker, W. J. (1843).—*Arthrotaxis tetragona* Hook. Ic. Pl. t. 560.

a 225619

Notes on Australian Orchids, with Descriptions of Three New Species.

Rev. H. M. R. Rupp, B.A.

Dendrobium rigidum R.Br.

The typical form of this little North Queensland epiphyte has dull whitish flowers, the labellum being bordered with deep red. Mr. Arnold Johnson, of Hambledon, near Cairns, has sent down specimens of a yellow-flowering form, very distinctive in appearance. As in the case of a large-flowered form described by Mr. Trevor Hunt in "The North Queensland Naturalist" for September, 1947, the inflorescence in Mr. Johnson's plant is chiefly racemose.

Diuris tricolor R. D. Fitzg.

The known range of this rare and attractive species has been surprisingly extended by Mr. Trevor Hunt, who sent down living specimens from Noosa, 80 miles north of Brisbane. One plant was an almost perfect replica of Fitzgerald's plate in "Australian Orchids," II, 5. Another was strikingly beautiful, the ground yellow of the flowers being replaced by cream. Previously the species has not been recorded beyond New South Wales, the known localities being Adelong, the Blue Mountains, and the Central Western Slopes.

Prasophyllum odoratum Rogers.

New record for this species; Pilliga Scrub, on the north-western plains of New South Wales, A. H. Chisholm, 9.1949. Mr. Chisholm's specimens of this widely-distributed and variable species differ from the type form in the following respects:—Flowers almost wholly white, with very narrow segments; the characteristic perfume appears to be lacking.

Dendrobium delicatum F. M. Bail.

Rumours of the occurrence of this very attractive Dendrobe in New South Wales are now definitely confirmed. Mr. John Young, of Earlwood, near Sydney, brought specimens from plants collected by Mr. J. Leaver, of Murwillumbah, on Mount Nullam, well inside the New South Wales northern border, in September, 1949.

Pterostylis ophioglossa R.Br.

In July, 1949, Mr. G. W. Althofer sent specimens of this Greenhood from the Carnarvon Range in Queensland. They belonged to var. *collina* Rupp, easily distinguished from the typical form by the smaller and more deeply coloured flowers. This variety, although rare, has now been recorded from three very widely separated localities—Paterson, in New South Wales, and Proserpine and the Carnarvon Range in Queensland. About the same time as Mr. Althofer found it in the last-named locality, Messrs. W. W. Abell and W. Power sent specimens of the type form from the Kingaroy district, where they also collected *P. mutica* R.Br. So far as I can ascertain, these are new locality records for both species.

Thelymitra purpurata Rupp.

The range of this species, which was previously recorded only from the Brunswick River on the far North Coast of New South Wales, is now known to extend as far south as Nabiac, between the Manning and Hunter Rivers, where it was collected by Mr. L. Gilbert, in September, 1948, and again in 1949.

Bulbophyllum waughense sp. nov.

Planta parvissima. Rhizoma serpens, c. 1 mm. latum. Pseudobulbi prostrati, striati, fere rhizoma complectens. Folium late lanceolatum, coriaceum, c. 2.5 cm. longum. Flores parvi, a pseudobulbis remoti. Sepala anguste lanceolata, c. 6 mm. longa, alba, venis longitudinalibus 3. Petala minutissima, vena 1. Labellum anguste oblongum, acutum, pallidum, canaliculatum, c. 4 mm. longum. Columna brevis; anthera fere orbiculata, stigma lunatum.

A very small plant. Rhizome creeping on trees, about 1 mm. wide. Pseudobulbs prostrate on the rhizome and almost embracing it, striate. Leaf broadly lanceolate, coriaceous, about 2.5 cm. long. Flowers small, arising from the rhizome between the pseudobulbs. Sepals narrowly lanceolate, about 6 mm. long, white with 3 conspicuous longitudinal veins. Petals very minute, with 1 vein. Labellum narrow-oblong, acute, pale, channelled, about 4 mm. long. Column short; anther almost orbicular, stigma semicircular.

Waugh's Pocket, Cairns district, North Queensland, Arnold Johnson, 8.1949, HOLOTYPE. Perhaps nearer to *B. Johnsonii* Hunt, than to any other, but quite distinct. Recent discoveries in North Queensland have now brought the number of known Australian species of *Bulbophyllum* to 28.

Diuris latifolia sp. nov.

Planta robusta, usque ad 30 cm. alta. Folia 2-3, c. 18 cm. longa x 1 cm. lata. Flores 4-7, flavi, notationibus fuscis. Sepalum dorsale obovatum, c. 20 mm. longum, notationibus fuscis separatis 2. Sepala lateralia linearia, viridia, c. 24 mm. longa. Petala acuta, lanceolata, fere cuneata, c. 22 mm. longa. Labellum c. 14 mm. longum, lamina angusta, carinata; lobi laterales 6-7 mm. longi, ad apices crenulati, maculati; lobus intermedius flabellatus, notationibus fuscis 2. Columnae alae altiores quam anthera obtusa.

A robust plant up to 30 cm. high. Leaves 2-3, probably the broadest in the genus, about 18 cm. long, and 1 cm. wide for the greater part of their length. Flowers 4-7, lemon yellow with some brown markings. Dorsal sepal large, obovate, about 20 mm. long, with 2 dark brown blotches not connected. Lateral sepals greenish, linear, slightly longer than the petals. Petals obliquely lanceolate, acute, almost cuneate, the short claw very dark; length of petal with claw about 22 mm. Labellum about 14 mm. long, with a narrow keeled lamina, the keel continued along the mid-lobe; lateral lobes 6-7 mm. long, obliquely cuneate, crenulate at the top, blotched towards the base, mid-lobe fan-shaped, shorter than the lamina, with 2 dark blotches about the middle. Wings of the column hardly denticulate, longer than the dark obtuse anther.

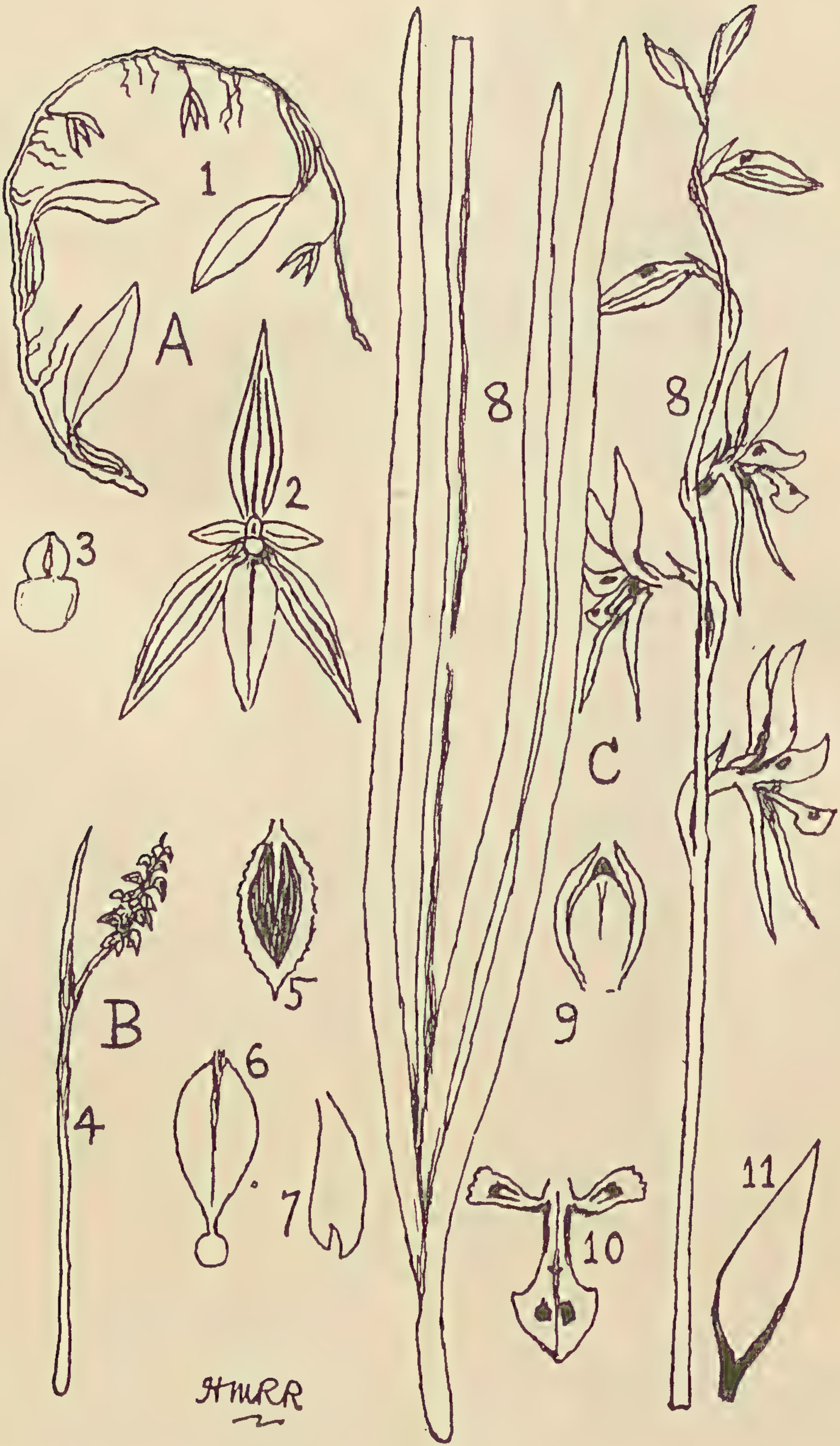
Baerami, via Denman, N.S.W., R. D. Crockett, 10.1949, HOLOTYPE. Mr. Crockett's specimens were forwarded to me by Mrs. W. C. Campbell, of Hunter's Hill. This is a handsome species, its nearest relative probably being *D. sulphurea* R.Br., but as the description shows, it differs importantly from that species in several respects. The consistently broad leaves are an outstanding feature of the plant. The labellum is sharply keeled from base to tip, but is devoid of callous plates along the lamina.

Prasophyllum albiglans sp.nov.

Planta pusilla, gracillima, usque ad 8 cm. alta. Folii lamina inflorescentiae adjacens, 2-3 cm. longa. Inflorescentia brevis, viridis, floribus 10-17. Perianthii segmenta ad apices omnia glandulosa. Sepala curva; lateralia ad bases unita, gibbosa, ad apices glandibus obscuris. Petala latiora brevioraque; glans apicalis magnus, albus, orbicularis, pertinax. Labellum ovato-oblongum, mucronatum, marginibus plus minusve serrulatis; callus magnus, fuscus. Columnae alae bilobatae, lobus externus paulum longior quam lobus internus. Anthera acuta.

A dwarf, very slender plant up to about 8 cm. high. Lamina of the leaf arising immediately below the inflorescence and sometimes exceeding it in length (2-3 cm.). Inflorescence short, dull green; flowers very small, 10-17. Segments of the perianth not widely expanding, all gland-tipped. Sepals curved; the laterals united at their gibbous base, their apical glands sometimes obscure. Petals broader and shorter; the apical gland large, pure white, orbicular, persistent. Labellum ovate-oblong, mucronate, with more or less serrulate margins; callous plate large, dark. Column-wings bilobate, obtuse, the outer lobe a little longer than the inner. Anther acute.

Pennant Hills, Miss I. Bowden, 3.1948, HOLOTYPE. Cowan, A. W. Dockrill, 3.1949; Asquith, Miss I. Bowden, 3.1949. All localities in the outer northern suburban area of Sydney. Apparently rare. Allied to *P. ansatum* R. D. Fitzg.; but the labellum has no auricles, and its margins are irregularly serrulate.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South Yarra
S.E. 1
F VICTORIA

THREE NEW SPECIES OF AUSTRALIAN ORCHIDS.

KEY TO PLATE.

A. *Bulbophyllum waughense.*
  1. Portion of plant, natural size.
  2. Flower from front, much enlarged.
  3. Column, much enlarged.

B. *Prasophyllum albiglans.*
  4. Plant, natural size.
  5. Labellum from above.
  6. Petal.
  7. Column wing.
  (5, 6 and 7 much enlarged.)

C. *Diuris latifolia.*
  8, 8. Plant, natural size.
  9. Column from front, much enlarged.
  10. Labellum from above, x2.
  11. Back of petal, x2.

Contributions to the Taxonomy of Australian Grasses.

JOYCE W. VICKERY, M.Sc.

Critical study of the collection of grasses in the National Herbarium of New South Wales has revealed the existence in this State of a number of species and varieties hitherto undescribed. Several of these are now named in this paper, and a few necessary combinations are made where required by present generic concepts. Critical comments are made on certain other noteworthy species.

In the citation of specimens examined in the preparation of this paper the following abbreviations are used to denote the location where the specimens may be found:—

BRI.—Herbarium, Botanic Gardens, Brisbane.

CAN.—Herbarium of the Commonwealth Scientific and Industrial Research Organization, Canberra.

K.—Herbarium of the Royal Botanic Gardens, Kew.

NSW.—National Herbarium of New South Wales.

SYD.—Herbarium of the School of Botany, University of Sydney.

STB.—Herbarium of Mr. S. T. Blake, Brisbane.

USDA.—United States Department of Agriculture Herbarium.

DIGITARIA.

D. ramularis (Trin.) Henrard, Blumea, I (1934), 101.

SYNONYM: *Panicum ramulare* Trin., Gram. Pan. Diss. Bot. (1826), 244-5.

This species was regarded as identical with *Panicum parviflorum* R. Br. (i.e. *Digitaria parviflora* (R.Br.) Hughes) by Bentham in the Flora Australiensis, VII (1878), 471, and was neglected by Hughes in her revision of "The Genus *Panicum* of the Flora Australiensis" (Kew Bull. 1923, 305-332). One specimen at Kew which was cited by both authors under *Panicum parviflorum* and *Digitaria parviflora* respectively, namely that collected at Parramatta by Woolls, is in fact *Digitaria ramularis*.

D. ramularis is readily distinguished from *D. parviflora* by the upper glume, which is about two-thirds as long as the lower lemma (not equal in length), rather more thinly membranous, very obtuse, 3-veined, the lateral veins parallel with the midrib for the greater part of their length then often curving over and anastomosing below the apex. The leaves also are generally densely pilose.

D. ramularis is not uncommon on the coast and tablelands of New South Wales, and is represented in the National Herbarium of New South Wales by the following specimens:—

New South Wales: Pheasant Mountain, Blackwater, T. Youman and E. N. McKie, 28.12.1936 (NSW. No. 7557); on ascent from Macleay River, west of Bellbrook, J. Vickery, 24.1.1934 (NSW. No. 7548); Gungal, J. L. Boorman, 11.1914 (NSW. No. 7554); Pennant Hills, J. Vickery, 29.2.1936 (NSW. No. 7549); Dural, J. Vickery, 28.2.1931 (NSW. No. 7550); Gordon, W. F. Blakely, 4.1914 (NSW. No. 7553); Killara, D. Price, 20.3.1949 (NSW. No. 7546); Cheltenham, E. Breakwell, 5.1912 (NSW. No. 7551); Cheltenham, W. M. Carne, 29.3.1914 (NSW. No. 7597); Cheltenham, L. Johnson, 5.2.1947 (NSW. No. 7578); Eastwood, G. B. Vickery, 4.1931 (NSW. No. 7556); Flemington, G. B. Vickery, 23.3.1930 (NSW. No.

7555); Cooks River, E. Breakwell, 11.1914 (NSW. No. 7552); St. Marys, J. Vickery, 11.4.1931 (NSW. No. 7544; SYD.); Woodford, D. L. W. Henderson, 1945 (NSW. No. 7545); Kowmung River, L. Johnson, 28.3.1948 (NSW. No. 7638); Mittagong to Jellore Creek, E. Cheel, 3.1916 (NSW. No. 7558).

D. parviflora (R.Br.) Hughes, Kew Bull., (1923), 311.

SYNONYMS: *Panicum parviflorum* R. Br., Prod., (1810), 192; *Panicum striatum* R. Br., l.c. non Lam. (1791); *Digitaria striata* Hughes, l.c.; *Panicum australe Spreng.*, Syst. Veg., I (1825), 309; *Panicum Steudelianum* var. *striatum* (R. Br.) Domin, Biblioth. Bot., LXXXV (1915), 296.

Bentham (Flora Australiensis, VII (1878), 471) united *Panicum striatum* R.Br. with *P. parviflorum* R.Br., though noting the smaller size or obsolescence of the lower glume. Hughes (l.c.) revived the species as *Digitaria striata*, citing only the type specimen collected by Robert Brown at Port Jackson. I have examined an extensive series of specimens from the Port Jackson district, and also duplicate numbers in the Herbarium of the Royal Botanic Gardens, Kew, of the two type specimens from the same locality. From a study of these I have no hesitation in regarding *P. parviflorum* R.Br. and *P. striatum*, R.Br. as conspecific. The lower glume varies from a minute structure or almost obsolescent condition to a distinct triangular glume up to 0.6 mm. in length. The majority of specimens are intermediate between these extremes and show a greater or less variability of the glume size in different spikelets. Very robust specimens usually show a larger glume; depauperate specimens have the glume much reduced. No other significant difference has been found between them.

This species is a lax tall-growing plant with the vegetative parts more or less glabrous except for a few hairs on the basal sheaths, generally found in forest lands where there is a tolerable supply of moisture. It is not uncommon near creeks on the sandstone soils of the Sydney district, and is found widely distributed in the coastal districts of the State. Specimens in the National Herbarium include the following:—

New South Wales: Cannungra, near Mt. Warning, J. L. Boorman, 4.1907 (NSW. No. 7602); Burringbar, B. Harrison, 2.1911 (NSW. No. 7604) and 2.1913 (NSW. No. 7623); Tabulam, A. Yates, 5.1913 (NSW. No. 7606); Byron Bay, E. Betche, 3.1896 (NSW. No. 7625 and 7598); Ramornie, 3 miles north-west of Copmanhurst, W. F. Blakely and D. W. C. Shiress, 7.1922 (NSW. No. 7609); Fernmount, E. Cheel, 28.5.1926 (NSW. No. 7603); Ascent from Macleay River, west of Bellbrook, J. Vickery, 24.1.1934 (NSW. No. 7589); Kempsey district, J. Vickery, 22.1.1934 (NSW. No. 7590); Kendall, F. M. Bailey, 9.1929 (NSW. No. 7619); Port Macquarie, J. L. Boorman, 6.1915 (NSW. No. 7633); Maitland, E. Breakwell, 5.1912 (NSW. No. 7629); Upper Williams River, J. Vickery, 11.1.1934 (NSW. No. 7601) and 28.5.1936 (NSW. No. 7610); Woy Woy, E. Betche, 3.1894 (NSW. No. 7607); Wamberal, E. Cheel, 4.1911 (NSW. No. 7630); Hornsby, W. F. Blakely, 4.1914 (NSW. No. 7616); Narrabeen, J. Vickery, 12.4.1935 (NSW. No. 7594); Cheltenham, J. Vickery, 4.6.1929 (NSW. Nos. 7591, 7592); Domain, Sydney, J. H. Camfield, 17.11.1902 (NSW. No. 7595); near Sydney, E. Betche, 3.1885 (NSW. No. 7600); Farm Cove, Sydney, J. H. Camfield, 7.1902 (NSW. No. 7622); Gladesville, Woolls, 7.1884 (NSW. No. 7614); Carlingford Cemetery, D. O. Cross, 10.5.1931 (NSW. No. 7586); Lapstone Hill, D. L. W. Henderson, 20.2.1947 (NSW. No. 7612); Kogarah, J. H. Camfield (NSW. No. 7587); Oatley, J. H. Camfield, 4.1901 (NSW. No. 7624); Como, E. Cheel, 3.1899 (NSW. No. 7631); Como, J. H. Camfield, 3.1898 (NSW. No. 7608; Port Hacking, G. B. Vickery, 4.5.1929 (NSW. No. 7596); National Park, J. Vickery, 14.2.1931 (NSW. No. 7593); Ulladulla, J. Vickery, 2.2.1935 (N.S.W. No. 7588).

D. diminuta Hughes, Kew Bull., (1923), 312.

This species resembles the two preceding in the general appearance of the panicle, though it is usually a rather more slender grass, the leaves and sheaths subglabrous, to rather densely pilose in some of the western specimens. It is readily distinguished from either by the short upper glume which is a quarter to one-third as long as the lower lemma, rotund-ovate and very obtuse, or often (including on the Type specimen from the McIntyre River, in the Herbarium of the Royal Botanic Gardens, Kew) truncate or obtusely and shallowly bilobed, nerveless or the two nerves very obscure.

D. diminuta occurs over a similar range of distribution in New South Wales to the two preceding species but may extend further across the tablelands to the drier western slopes. It is represented in the National Herbarium and Sydney University collections by the following specimens:—

New South Wales: Toabinga, Moredun Creek, near Guyra, E. N. McKie, 21.4.1930 (NSW. No. 7564); Moredun Creek, 27 miles north-west of Guyra, E. N. Mckie, 5.2.1932 (NSW. No. 7574); Boorolong, 20 miles south-west of Guyra, E. N. McKie, 26.1.1948 (NSW. No. 7572); Cangai, Upper Clarence River, J. L. Boorman, 5.1916 (NSW. Nos. 7569, 7577); Warialda, E. J. Hadley, 4.1908 (NSW. No. 7567); Warialda, J. Vickery, 1.1932 (NSW. No. 7561); Pilliga Scrub, Narrabri, J. B. Cleland, 25.11.1916 (NSW. No 7563); Pilliga, H.M.R. Rupp, 11.1932 (SYD.); Howell, J. L. Boorman, 12.1914 (NSW. Nos. 7565, 7566); Flemington, J. Vickery, 31.3.1929 (NSW. No. 7571); Richmond, per Hawkesbury Agricultural College, 12.4.1907 (NSW. No. 7573); St. Mary's, J. Vickery, 11.4.1931 (NSW. No. 7559); Woodford, D. L. W. Henderson No. 241, 3.1.1947 (NSW. No. 7576); Kogarah, J. H. Camfield, 1894 (NSW. No. 7562); Oatley, J. H. Camfield, 2.1897 (NSW. No. 7575); Kowmung River, L. Johnson, 28.3.1948 (NSW. No. 7579); Nowra district, J. L. Boorman, 2.1910 (NSW. No. 7568); Kangaroo Valley, B. Smart, 20.5.1947 (NSW. No. 7570).

The three species enumerated above may be distinguished as follows:—

1. Upper glume equal or subequal to the lower lemma and similar in texture, sometimes appearing slightly shorter at maturity owing to retraction around the turgid fertile lemma, subacute to obtuse, the three nerves converging somewhat towards the apex. Tall-growing species with leaves and sheaths more or less glabrous except for the basal sheaths........ *D. parviflora* (R.Br.) Hughes.

1.* Upper glume distinctly shorter than the lower lemma. Usually more slender and rather shorter grasses.

  2. Upper glume two-thirds to three-quarters as long as the lower lemma, slightly more thinly membranous in texture, very rounded at the apex, distinctly 3-nerved, the lateral nerves sometimes curved inwards just below the hyaline apex and anastomosing with the midvein. Leaves and sheaths usually densely pilose...................... *D. ramularis* (Trin.) Henrard.

  2.* Upper glume one-quarter to one-half as long as the lower lemma, rotund to truncate or shallowly bilobed, thinly membranous, nerveless or with two very obscure nerves. Leaves more or less glabrous to pilose..........................*D. diminuta* Hughes.

D. leucostachya (Domin) n. comb.

SYNONYM *Panicum leucostachyum* Domin, Biblioth. Bot., LXXXV (1915), 299.

This species was described by Domin from three localities in Queensland, viz., Russell River, Pentland and Stradbroke Island. It is here recorded for New South Wales and is represented in the National Herbarium by specimens from two localities, which were collected on or near fixed sand dunes close to the ocean foreshores. In some respects it resembles *D. Brownei* (R. & S.) Hughes, but differs in its densely caespitose, leafy habit, the undivided or once divided panicle, and in New South Wales at least occurs well outside the normal range of that species which is found from the drier tablelands to the western plans. It is further distinguished by the hyaline lower glume which is minute and rounded, or obsolescent. In *D. Brownei* the lower glume is firm, more or less triangular and typically acute and up to one-third as long as the spikelet, though in some specimens it is shorter and more or less obtuse.

Specimens in the National Herbarium are:—

New South Wales: South West Rocks, J. Vickery, 28.1.1936 (NSW. No. 7709); Port Stephens, Nelson's Bay, L. R. Fraser, 1.1931 (NSW. No. 7706), and J. Vickery, 6.2.1937 (NSW. Nos. 7707, 7708).

D. hystrichoides n. sp.

Gramen perenne laxe caespitosum, erectum vel ascendens, saepe geniculatum, usque ad 30 cm. altum paniculam patentem excludens, base paullo nodosa et hirsutissima; culmi 4-5 nodes, tandem subglabri, laeves et paullo lucentes, obscure striati, sed primum pilis paucis evanescentibus fragilibus, internodis brevibus, saepe ad nodos

superiores ramosi; nodi pubescentes vel dense hirsuti pilis longis erectis vel reflexis vel patentibus; vaginae saepe quam internodi longiores, laxae striatae, plerumque dense hirsutae pilis longis patentibus ad bases tuberculatis vel lanato-pubescentes, vagina superiore distantissime hirsuta; ligula membranacea, obtusa, 1-2 mm. longa; laminae planae, 3-6 mm. latae, lineares, ad apices acuminatos breviter angustatae, plerumque 8-15 cm. longae, hirsutae pilis ad bases tuberculatis praesertim subter vel pubescentes; panicula tandem exserta, racemis digitatis rigide patentibus inferioribus verticillatis et 6-10-natis, superioribus 1-natis vel plus minusve verticillatis, pedunculo tereti, laevi, rhachide angulato, laevi, axillis racemorum condensatis et dense pubescentibus vel hirsutis; racemi inferiores 15-30 cm. longi, ad bases nudi usque ad 5-12 cm., angulato-triquetri in angulis supra scabri spiculas distantes 2-natas praesertim ad latus unum ferentes, spicula inferior brevissime pedicellata (0.5-1 mm.), superior pedicello 4 mm. longo, vel racemi spiculis superioribus saepe 1-natis; pedicelli angulati et in angulis scabri; spiculae 3-3.5 mm. longae, lanceolatae, plus minusve pilis vestitae; gluma inferior ovata, obtusa vel triangulo-acuta, ca. 0.5-0.8 mm. longa, glabra, 1-nervata vel nervo obscuro; gluma superior quam spicula brevior et angustior, ca. 2-5 mm. longa et 0.5 mm. lata, oblongo-linearis vel anguste triangularis, subacuta, 3-nervata, primum paullo membranacea, tandem firma, in dorso inter nervos pilis 1-1.5 mm. longis, tenuissimis sericeis vel paullo lanatis primum laxe adpressis tandem valide patentibus vestita; lemma inferius sterile 5-nervatum, ca. 3-3.5 mm. longum, ovatum, subacutum, ad apicem firmum subrostratum angustatum, marginibus involutis, in dorso ad margines pilis tenuissimis sericeis vel paullo lanatis vestitum, ad basem et in dorso inter nervos interiores subglabrum, apice rostrato glabro praeter marginibus, nervis interioribus aliquanto tuberculatis, pilos breves tenues et etiam pilos firmos crassiores subsetosos aciculares ferentibus, pilis omnibus primum appressis tandem valide patentibus; flosculi sterilis palea hyalina, ca. 0.5 mm. longa, obtusa; lemma fertile ca. 2-2.5 mm. longum, oblongum, breviter apiculatum, obscure striatum, tenuiter cartilagineum, tandem fulvum, lucens, marginibus planis, tenuibus, palea textura similis; stamina 3; lodiculi oblongo-cuneati vel rectangulares.

HOLOTYPE: *New South Wales*: Gerelah, Nyngan, J. C. Butchee, 20.2.1936 (NSW. No. 8017).

Loosely caespitose, hirsute perennial, erect or ascending, often geniculate at the nodes, up to 30 cm. high excluding the spreading panicle, slightly knotted and very hirsute at the base; culms 4-5-noded, at length sub-glabrous, smooth and rather shining, obscurely striate, but at first with a few evanescent brittle hairs, the internodes rather short, often branching from the upper nodes; nodes pubescent, or densely hirsute with erect, reflexed or spreading long hairs; sheaths often longer than the internodes, loose, usually densely hirsute with long spreading tubercle-based hairs, to woolly pubescent, the uppermost sheath very sparsely hirsute, striate with the main nerves alternating with groups of finer nerves; ligule membranous, obtuse, 1-2 mm. long; blades flat, 3-6 mm. wide. linear, rather shortly narrowing into an acuminate tip, mostly 8-15 cm. long, both surfaces hirsute with tubercle-based hairs, the tubercles especially evident on the lower surface, or pubescent; panicle at length exserted, consisting of digitate stiffly spreading racemes, the lower racemes whorled with about 6-10 branches in the whorl, the upper branches arising singly or more or less whorled from the main rhachis, the peduncle terete, smooth, the rhachis angular, smooth, the axils of the racemes thickened and densely pubescent or hirsute, lower racemes 15-30 cm. long, bare at the base for 5-12 cm., angular-triquetrous, scabrous on the angles in the upper part, bearing distant spikelets in pairs chiefly on one side, the lower spikelet of the pair very shortly (0.5-1 mm.) pedicellate, the upper spikelet with a pedicel up to

4 mm. long, the pedicels angular and scabrous on the angles, the uppermost spikelets of the raceme often borne singly; spikelets 3-3.5 mm. long, lanceolate, more or less concealed by hairs at maturity; lower glume ovate, obtuse to triangular acute, about 0.5 mm. long, glabrous, 1-nerved or the nerve obscure; upper glume shorter and narrower than the spikelet, about 2.5 mm. long, and 0.5 mm. wide, oblong-linear to rather narrowly triangular, sub-acute, 3-nerved, rather membranous when young, firm at maturity, on the back densely clothed between the nerves with 1-1.5 mm. long very fine silky or slightly woolly hairs which are loosely appressed at first, then at length much spreading; lower sterile lemma 5-nerved, about 3-3.5 mm. long, ovate, sub-acute, narrowed into a rather firm beak-like apex, the margins membranous, infolded, on the back towards the margins densely clothed with 1-1.5 mm. long very fine silky or slightly woolly hairs, the base and back in the region between the first nerves on each side of the mid-nerve sub-glabrous, the beak-like apex also glabrous except on the margins, the inner nerves somewhat tuberculate and bearing both very fine short hairs and also coarser and firm sub-setose, needle-like hairs, both coarse and fine all appressed when young, much spreading at maturity, the coarse hairs stiffly erect; palea of the sterile floret hyaline, about 0.5 mm. long, obtuse; fertile lemma about 2-2.5 mm. long, oblong, shortly apiculate, obscurely striate, thinly cartilaginous, brown at maturity, shining, the margins flat, thin, folded around the palea; palea similar in texture to the lemma and with it folded around the floret; stamens 3; lodicules oblong-cuneate to rectangular.

LOCALITIES: *New South Wales*—Hungerford to Brindingabba, J. L. Boorman, 10.1912 (NSW. No. 8019); Bourke, per Soil Conservation Service, 1941 (NSW. No. 8025); Waverley Downs, A. W. Muller No. 53, 4.1906 (NSW. No. 8024); Byrock, J. Vickery, 22.12.1934 (NSW. No. 8028); Byrock, N. C. Beadle, 3.1941 (SYD.); Coolabah, R. W. Peacock, 4.1900 (NSW. No. 8018; SYD.); Coolabah, manager of the Nyngan Demonstration Farm (NSW. Nos. 8020 and 8031); Nyngan district, A. D. Forbes, 21.4.1947 (NSW. No. 8026); Nyngan, E. Breakwell, 10.1912 (NSW. No. 8030); Nyngan Experiment Farm, 4.1912 (NSW. No. 8032); Warren, L. Peacocke, 11.1.1933 (NSW. No. 8029); Western Division, Fletcher (NSW. No. 8027).

This species superficially resembles *Digitaria ammophila* (F. Muell.) Hughes very closely and could be readily confused with it. On re-examining specimens in the National Herbarium of New South Wales recently, which had been variously referred to *D. divaricatissima, D. coenicola* and *D. ammophila,* I observed that there appeared to be about equal numbers of specimens of two distinct forms which appeared to be closest to *D. ammophila* of the previously described species. Through the courtesy of the Director of the Melbourne National Herbarium, I was able to examine the two Syntype specimens of *Panicum ammophilum* F. Mueller, from "Sand hills along the Murray River, F. Mueller, 1851 and 1853," respectively, and refer one of the forms to that species. The other form is here described as *D. hystrichoides.* It may be distinguished from *D. ammophila* on the following characters:—

D. ammophila.—Lower lemma 2-2.5 mm. long distinctly exceeded by the fine hairs so that the spikelet appears to be 3.5-4 mm. long, villous all over the back almost from the base to the apex with very fine hairs all more or less similar and up to 2.5 mm. in length.	*D. hystrichoides.*—Lower lemma 3 mm. long, very shortly exceeded by the hairs, villous with very fine hairs up to 1.5 mm. in length on the back only along the marginal region, glabrous along the centre of the back and at the base and apex, the intervening region somewhat tuberculate and bearing distinctly stiffer needle-like hairs amongst very fine short hairs.
Upper glume ovate-oblong, 3-5 nerved.	Upper glume narrower, linear-oblong to narrowly triangular.
Hairs more or less completely obscuring the upper glume and lower lemma.	Hairs not or scarcely obscuring the base, somewhat rostrate apex and mid-region of the lower lemma.

The stiff needle-like hairs of the lower sterile lemma suggest a distant relationship to *Digitaria macractenia* (Benth.) Hughes and *D. ctenantha* (F. Muell.) Hughes, but are not so prominently differentiated as in those species, which differ also in diverse other respects.

D. ammophila appears to be distributed over much the same area as *D. hystrichoides* in New South Wales. It is represented in the New South Wales National Herbarium and Sydney University collections by the following specimens:—

New South Wales: Warialda, H. M. R. Rupp, 3.1906 (NSW. No. 8035); Warialda, E. J. Hadley, 5.1908 (NSW. No. 8039); Collarenebri to Walgett, western road, J. Vickery, 21.12.1934 (NSW. No. 8037); Warrego River, E. Betche, 9.1885 (NSW. No. 8036); Waverley Downs, A. W. Muller No. 39, 4.1906 (NSW. No. 8034); Bourke, W. K. Glover, 20.3.1949 (NSW. No. 7531); Narrabri, J. H. Maiden, 11.1899 (NSW. No. 8041); Pilliga, H. M. R. Rupp, 11.1932 (SYD.).

Victoria: Mallee district, north-western Victoria, Chas. Walter, 11.1887 (NSW. No. 8033).

D. neurachnoides n. sp.

Gramen perenne, gracile caespitoso-ascendens, ca. 40 cm. altum. aliquanto geniculatum et ad nodos ramosum, ad basem lanatum et aliquanto nodosum; culmi graciles, laeves vel paullo microscaberuli, obscure striati, subteretes; nodi glabri vel paullo pubescentes; vaginae laxiusculae, tenuiter striatae, scabriusculae vel inferiores scabro-pubescentes, aliquanto ad collares auriculatae; ligula membranacea, obtusa, truncata vel denticulata ca. 1 mm. longa; laminae 5-10 cm. longae, in sicco involutae explanatae ca. 2 mm. latae, anguste attenuatae, infra minute et distante scabro-pubescentes, supra valide scabro-pubescentes; panicula exserta, 3-4-ramosa ad axillas minute pubescens, rhachide triquetro; racemi 1-nati nunquam verticillati, paullo flexi, triquetri, in angulis scabriusculi e base spiculas ferentes; spiculae 2-nati, una brevissime pedicellata, alia longe (4 mm.) pedicellata, ca. 3.25 mm. longae; gluma inferior late ovata vel subrotunda, obtusissima, ca. 0.5 mm. longa; gluma superior spiculam subaequans, ca. 3 mm. longa, lanceolata, acuta, firma, 3-nervata, in dorso inter nervos pilis tenuissimis sericeis vel paullo lanatis 1-1.5 mm. longis laxe appressis vel tandem patentibus vestita; lemma inferius sterile 3.25 mm. longum, ovato-lanceolatum, firmum, acutum, 7-nervatum, marginibus paullo supra involutis, in dorso inter margines et nervos exteriores pilis tenuissimis sericeis vel paullo lanatis 1-1.5 mm. longis laxe appressis vel tandem patentibus vestitum, et in dorso infra medium ad nervum medium utrinque pilorum similium fasciculis duobus, ceterum in dorso glabrum; palea 0.5 mm. longa, tenuiter membranacea et saepe ad lemma adhaerens; lemma fertile tenuiter cartilagineum, obscure striatum, fulvum, lucens, ellipticum, ca. 2-2.5 mm. longum, 0.9 mm. latum, paullo apiculatum, marginibus tenuibus; palea textura lemmati similis; embryo quam germen bis brevior.

HOLOTYPE: *Queensland*: Gilruth Plains, Cunnamulla, on red sandy surfaced soil, R. Roe No. R139, 27.2.1941 (NSW. No. 8244. Duplicate specimen at CAN.).

Slender, caespitose-ascending perennial, about 40 cm. high, somewhat geniculate and branching at the nodes, woolly and somewhat knotted at the base. Culms slender, smooth or slightly microscaberulous, shining, obscurely striate, sub-terete; nodes glabrous or slightly pubescent; sheaths rather loose, finely striate, slightly scabrous, or the lower scabrous-pubescent, somewhat auriculate at the collar; ligule membranous, obtuse, truncate or notched, about 1 mm. long; blades 5-10 cm. long, inrolled when dry, about 2 mm. wide when flattened, narrowly attenuate, minutely and rather distantly scabrous-pubescent on the lower surface, very scabrous-pubescent on the upper surface; panicle exserted, 3-4-branched into simple racemes arising singly from the triquetrous rhachis, minutely pubescent at the joints, the branches never whorled;

racemes slightly flexuose, triquetrous, slightly scabrous on the angles, bearing the spikelets in rather closely-spaced pairs from the base upwards, one spikelet of each pair very shortly pedicillate, the other borne on a pedicel about 4 mm. long; spikelets about 3.25 mm. long; lower glume broadly ovate to sub-rotund, very obtuse, about 0.5 mm. long; upper glume almost equalling the spikelet, about 3 mm. long, lanceolate, acute, firm, 3-nerved, on the back between the nerves densely clothed with very fine silky to slightly woolly hairs 1-1.5 mm. in length which are loosely adpressed or ultimately spreading; lower sterile lemma 3.25 mm., ovate-lanceolate, firm, acute, the margins somewhat infolded above, 7-nerved, on the back between the margins and the outermost nerves densely clothed with very fine silky to slightly woolly hairs 1-1.5 mm. in length, which are loosely adpressed or ultimately spreading, and with two dense transverse tufts of similar hairs placed on the back a little below the middle on either side of the mid-nerve, the back otherwise glabrous; palea about 0.5 mm. long, thinly membranous and often adhering closely to the lemma; fertile lemma thinly cartilaginous, obscurely striate, brown, shining, elliptical, about 2-2.5 mm. long x 0.9 mm. broad, slightly pointed, the margins thin, folded around the palea; palea similar in texture to the lemma; embryo half as long as the grain.

LOCALITIES: *New South Wales*: Tarcoon, J. L. Boorman, 11.1903 (NSW. No. 8050); without exact locality, R. Helms (NSW. No. 8243).

This species resembles but is distinct from *D. Baileyi* var. *patens* Domin. The inflorescence is suggestive of *D. Brownei* (R. & S.) Hughes, but the transverse tufts of hairs on the back of the lower sterile lemma are quite unlike that species. This character as well as the non-whorled racemes bearing spikelets from their bases also sharply differentiates *D. neurachnoides* from *D. ammophila*, *D. hystrichoides* and related species.

The peculiar disposition of the hairs was observed by Ernst Betche, who commented on them in a note on the herbarium sheet of the Tarcoon specimen. He placed the specimen as a distinctive variety of the species now known as *D. Brownei*, but apparently never published a description of it.

D. coenicola (F. Muell.) Hughes var. **ramosa** n. var.

Ab typo paniculae ramis inferioribus iterum unilateraliter ramosis, ramis ultimatis 3-12 cm. longis ex rhachide rigide patentibus 3-10 spiculas 1-2-natas ferentibus differt.

HOLOTYPE:—*New South Wales*: Oakwood, via Inverell, M. Woods, 9.2.1941 (NSW. No. 8055).

Differs from the Type in that the lower panicle branches are again unilaterally branched, these ultimate branchlets being 3-12 cm. long, stiffly spreading from the main rhachis, and bearing 3-10 paired or solitary spikelets.

LOCALITY: *New South Wales*: Oakwood, J. W. Cutler, 8.4.1936 (N.S.W. No. 8054).

Apart from the inflorescence character, the variety agrees closely with *D. coenicola*, though the branched racemes appear to show an unusual character in the genus *Digitaria*.

The characters by which *D. coenicola* (F. Muell.) Hughes and *D. divaricatissima* (R.Br.) Hughes are distinguished in Hughes' "The Genus *Panicum* of the Flora Australiensis" (Kew Bull., 1923, 305), and also in Bentham's Flora Australiensis, are not always readily applicable to a wider range of material than was seen by those authors. The sizes of the spikelets given by Bentham are often exceeded by both species. While the relative length of the upper glume to the spikelet, as mentioned by Hughes, is a fairly reliable but very fine distinction, the relative pubescence of the leaves is only of general and not of strict application. This has led to considerable confusion between the two species at least in the National Herbarium collections. The following characters are therefore given in an attempt to indicate the more salient differences.

D. coenicola.—Spikelets linear-elliptical to linear-lanceolate, 4.5-5 mm. but usually 5 mm. long, the rather woolly hairs chiefly conspicuous and spreading in the upper part and giving the spikelet an obtuse appearance.	*D. divaricatissima.*—Spikelets lanceolate, 3.75-5 mm., but usually 4-4.5 mm. long, usually appearing more or less acute in spite of the rather woolly hairs.
Upper glume sub-equal to the spikelet.	Upper glume silghly but distinctly shorter and narrower than the spikelet.
Axils of the whorl of racemes hirsute with hairs 1-3 mm. long.	Axils of the racemes shortly pubescent, the hairs seldom attaining 0.5 mm.
Leaves and sheaths usually densely woolly-pubescent, the hairs rarely becoming partially suppressed.	Basal sheaths usually rather densely hirsute, the upper sheaths variously subglabrous, hirsute or occasionally woolly-pubescent.

Through the courtesy of the Director of the Melbourne National Herbarium, I have examined the Holotype Specimen of *Panicum coenicolum* F. Muell. from Cudnaka, South Australia, coll. F. Mueller, Oct. 1851. The species is represented in the National Herbarium of New South Wales, and Sydney University Herbarium by the following collections:—

New South Wales: Coolabah, Manager of the Nyngan Demonstration Farm (NSW. No. 8042); Liverpool Plains, E. Betche, 2.1880 (NSW. No. 8049); Narromine, R. Helms, 12.1892 (NSW. No. 8043); Nyngan, L. J. Little (NSW. No. 8047); Nyngan-road, E. N. McKie, 24.4.1939 (NSW. No. 8048); Cobar, L. Abrahams, 4.1910 (NSW. No. 8045); Broken Hill, A. Morris, 3.1921 (NSW. No. 8044); between Trangie and Narromine, D. L. W. Henderson No. 229, 31.12.1946 (NSW. No. 2339); Condobolin, N. C. Beadle, 1.2.1946 (SYD.); Western Division of N.S.W., Fletcher (NSW. No. 8056).

D. divaricatissima (R.Br.) Hughes is represented in the National Herbarium by a fairly extensive series of specimens ranging from coastal districts to far inland in New South Wales. While some variation occurs within the species, it does not seem practicable at present to segregate any taxonomic units.

BRACHIARIA.

B. advena n. sp.

Gramen annuum ascendens, glabrescens, ad nodos geniculatum ramosum et radicatum; culmi 45-120 cm. longi, graciliusculi, laeves, ad vaginas unilateraliter canaliculati, compressiusculi, pedunculis gracilibus validiore compressis; nodi pubescentes; vaginae saepe laxae, laeves, striatae, glabrescens vel praesertim ad margines basesque pilis brevibus distantibus; ligula ciliata; laminae lineare-attenuatae, 5-15 cm. longae et usque ad 5 mm. latae, plus minusve planae vel in sicco infra aliquanto carinatae plicataeque supra involutae, tenuiter acuminatae, glabrae, supra laeves, infra leviter striatae, in canaliculis marginibusque minute scaberulae; panicula tandem longe exserta, unilateralis, racemis 3-6, 1-2-natis, erectis simplicibus, spiciformibus; axis primarius triqueter supra in angulis scabro-pubescens vel breviter pilosus; racemi 1.5-2.5 cm. longi, pubescentes, unilateraliter spicularum ordones duos densos ferentes; pedicelli breves, circa spiculam quamque ciliorum annulis; spiculae virides, 3-3.5 mm. longae, pubescentes, oblongo-ellipticae, subacutae; gluma inferior ad rhachidem locata, usque ad quam spicula quadruplo brevior, membranacea, acuta vel obtusa, glabra; gluma superior spiculam aequans, herbacea, 5-nervata, oblongo-elliptica; lemma inferius ambitu simile, 3-nervatum, sine palea; lemma superius fertile induratum, ca. 2.75 mm. x 1.5 mm., anguste obovato-oblongum, obscure 3-nervatum, minute longitudine papilloso-rugosum; palea similiter indurata et papilloso-rugosa, marginibus hyalinis.

HOLOTYPE: *New South Wales*: Glen Innes, A. Noble, 13.2.1948 (NSW. No. 8475).

Ascending annual, glabrescent, branching and rooting from the nodes, geniculate; culms 40-120 cm. long, rather slender, smooth, channelled on one side towards the sheath and slightly compressed, the slender peduncle more strongly compressed; nodes pubescent; sheaths often loose, smooth, striate, glabrescent or with a few short scattered hairs especially towards the margins and near the base; ligule ciliate; blades linear-attenuate, 5-15 cm. long, and up to 5 mm. broad, more or less flat, or when dry tending to be keeled and folded towards the base, inrolled above, finely acuminate, glabrous, the upper surface smooth, the lower surface lightly striate, minutely scaberulous in the shallow grooves and on the margins; panicle at length much exserted, one-sided, consisting of 3-6 1-2-nate erect one-sided spike-like simple racemes, the main rhachis triquetrous, scabrous-pubescent to shortly pilose on the angles in the upper part; racemes 1.5-2.5 cm. long, pubescent, bearing the subsessile spikelets in two close ranks on one side, the very short pedicels with a ring of cilia around each spikelet; spikelets green, 3-3.5 mm. long, pubescent, oblong-elliptical, sub-acute, the lower glume towards the rhachis; lower glume one quarter the length of the spikelet or sometimes shorter, membranous, acute or obtuse, glabrous; upper glume equalling the spikelet, herbaceous, 5-nerved, oblong-elliptical; lower lemma similar in size and shape, 3-nerved, without a palea in its axil; fertile floret indurated, about 2.75 mm. x 1.5 mm. narrow obovate-oblong, faintly 3-nerved, minutely papillose-rugose in parallel longitudinal lines; palea similarly indurated and papillose-rugose, and with the lemma enclosing the grain, its margins hyaline.

LOCALITIES: *New South Wales*: Guyra district, G. T. Dawson, 3.1937 (NSW. No. 8477); Stonehenge, E. N. McKie, 4.1937 (NSW. No. 10220); Glen Innes, per New England Experiment Farm, 9.3.1937 (NSW. No. 8478); Botanic Gardens, Sydney (grown from seed from Glen Innes), E. Bennett, 23.3.1939 (NSW. No. 9002; K.; U.S.D.A.); Botanic Gardens, Sydney (grown from seed received as an impurity in *Phalaris tuberosa*), C. Fry, 6.1.1943 (NSW. No. 8476); Glen Innes, J. B. Noonan, 11.1.1950 (NSW. No. 10576).

This species resembles in appearance and habit *Brachiaria erucaeformis* (J. E. Smith) Griseb., a species which is apparently native to regions from Central India westwards to Spain, and eastern and southern Africa, and now introduced into various other parts of the world, where it is usually found on cultivated ground. *B. advena*, however, differs markedly in its larger floret which is distinctly though finely papillose-rugose (not smooth), and in the longer and relatively narrower alternate leaves.

It is with some diffidence that I have described this species, as its occurrence in N.S.W. definitely suggests that it is introduced and not a native of Australia. However, enquiries at the Royal Botanic Gardens, Kew, and the United States Department of Agriculture have failed to find any species which matches it. I am indebted to Mr. C. E. Hubbard and Dr. J. R. Swallen for the searches which they made in these institutions respectively. Its country of origin is, therefore, at present unknown.

Brachiaria advena is now well established and widespread on the New England Tableland in N.S.W., chiefly in cultivated land. It has often been observed in paddocks sown to *Phalaris tuberosa*, probably because the seed is somewhat similar in size and hard to separate, and it has therefore been found on various occasions as an impurity in *Phalaris* seed. It does not thrive so well on native grass country. In cultivation it is said to grow to a height of four feet, to seed freely, and this combined with its habit of rooting at the nodes, and its quick growth, makes it difficult to control. Stock will eat it readily when it is young, but are less fond of it when it is seeding.

PASPALIDIUM.

P. gracile (R.Br.) Hughes var. **debile** n. var.

Ab typo habitu gracillimo delicato, culmis gracillimis, foliis tenuibus angustis plus minusve hirsutis, panicula pauciflora, spiculis brevioribus angustioribusque differt.

Holotype: *New South Wales*: Hurstville, J. H. Camfield, 5.1901 (NSW. No. 9168).

Differs from the type in its very slender delicate habit, very fine culms and narrow (1-1.25 mm.), thin, more or less hirsute leaves, the panicle few-flowered, the spikelets a little shorter and narrower.

Localities: *New South Wales*: Botanic Gardens, Sydney, cult., W. F. Blakely, 5.4.1916 (NSW. No. 9174; SYD.); Bray's Bay, Parramatta, A. A. Hamilton, 11.1919 (NSW. No. 9170); Bent's Basin, Nepean River, E. Cheel and J. L. Boorman, 9.1913 (NSW. No. 9175); Kowmung River, L. Johnson, 28.3.1948 (NSW. No. 9169); Stanwell Park, A. A. Hamilton, 6.1909 (NSW. No. 9172) and 7.1909 (NSW. No. 9171).

This may prove to be a distinct species, but as the florets are a little immature on most of the specimens it is difficult to compare their ultimate shape and size with that of *P. gracile*, so I prefer to regard it as a very fine lax variety for the present. Under *Panicum gracile* R.Br., this variety was the subject of comment by A. A. Hamilton in Proc. Linn. Soc. N.S.W., xxxv (1910), 415.

P. aversum n. sp.

Gramen perenne, laxum, ascendens vel semierectum, saepe geniculatum, plus minusve caespitosum vel aliquando ad nodos radicatum, plus minusve glabrum, culmi ca. 4-6-nodes, infirmi, fistulati, tenuiter striati, laeves vel inter nervos scaberuli; nodi glabri; vaginae laxae, graciliusculae, laeves, glabrae vel in marginibus et collaribus paullo ciliatae; ligula ca. 1 mm. longa, infra membranacea, supra in ciliis divisa; laminae planae vel in sicco tandem laxe involutae, tenues, 10-25 cm. longae, 3-8 mm. latae, attenuatae, striatae, antrorsum scabrae, virides vel rare paullo glaucescentes; panicula tandem longe exserta, 10-30 cm. longa, unilateralis, rhachide triquetro, racemos unilaterales spiciformos laxe adpressos 1-7 cm. longos ferens; racemi 1-nati vel 1-2 ramos breves auxiliarios ferentes, plerumque indivisi sed aliquando ramis paucis brevibus; rhachis secondarius angulare-triqueter, in angulis scaber, flexuosus, in seta brevissima terminatus; pedicelli ca. 0.5 mm. longi; spiculae in ordinibus duobus alternae, tandem gibberrimae et irregulariter oblique retroque reflexae, viridescentes, ovatae, acutae, 2.5-2.75 mm. longae; gluma inferior ad basem tandem inflata, orbiculare-ovata, in apicem brevem acutum angustata vel plus minusve obtusa, quam spicula dimidio brevior, tenuis, 3-5-nervata, nervis lateralibus superne anastomosantibus; gluma superior quam spicula paullo brevior, tenuis, 5-7-nervata nervis superne anastomasantibus, rotunda, obtusa vel subacuta, circa fructum convexissima; lemma inferius sterile in dorso concavum, ovato-rotundum, acutum, tenue, 5-nervatum, nervis superne anastomosantibus, aliquando palea parva membranacea; lemma superius fertile crustaceum, rugulosum, late elliptico-rotundum, acutum, in dorso gibberrimum, obscurissime nervatum, marginibus involutis crassis crustaceis; palea late elliptica, similiter crustacea et tenuiter rugulosa; caryopsis suborbicularis, embryone bis breviore; stamina 3.

Holotype: *New South Wales*: Tamworth, T. F. Mau, 18.2.1941 (NSW. No. 8982).

Lax, ascending to semi-erect perennial, often much geniculate, more or less caespitose or sometimes rooting at the lower nodes, branching from the nodes, more or less glabrous; culms about 4-6-noded, weak, hollow, very compressible, finely striate, smooth, or minutely scaberulous between the nerves; nodes glabrous; sheaths loose, rather thin, smooth, glabrous or with some cilia along the margins and at the collar; ligule about 1 mm. long, membranous below, divided into cilia above; blades flat, or at

length loosely inrolled on drying, thin, 10-25 cm. long, 3-8 mm. broad, green or occasionally slightly glaucous, attenuate, striate, antrorsely scabrous; panicle at length much exserted, 10-30 cm. long, one-sided, the rhachis triquetrous, the branches one-sided spike-like loosely appressed racemes, the lower 1-7 cm. long and often but not always overlapping the internodes, 1-nate or with 1 or 2 short auxiliary branches, usually unbranched but sometimes with a few short branches, the secondary rhachis very angular triquetrous, scabrous on the angles, very flexuose, each branch terminated by a very short bristle; pedicels about 0.5 mm. long; spikelets alternate in two rows, very gibbous and rather irregularly bending outwards and backwards from the rhachis (not appressed in two regular ranks as in *P. jubiflorum*), light green, ovate, acute, 2.5-2.75 mm. long; lower glume inflated at the base at least at maturity giving the spikelet a bent-back appearance, orbicular-ovate, narrowed into a short acute apex or more or less obtuse, less than half as long as the spikelet, thin, 3-5-nerved, the lateral nerves anastomosing above; upper glume a little shorter than the spikelet, thin, 5-7-nerved with the nerves anastomosing above, rotund, obtuse to sub-acute, very convex around the gibbous fruit; lower lemma dorsally concave, ovate-rotund, acute, thin, 5-nerved, the nerves anastomosing at the apex, sometimes with a small membranous palea in its axil; fertile lemma crustaceous, rugulose with thick crustaceous smooth inrolled margins, broadly elliptical-rotund, acute, very gibbous on the back, semi-rotund to semi-orbicular when viewed from the side, very obscurely veined; palea broadly elliptical, similarly crustaceous and finely rugulose, and with the lemma enclosing the grain; grain sub-orbicular, the embryo more than half as long; stamens 3.

LOCALITIES: *New South Wales*: Gravesend, E. Breakwell, 5.1915 (NSW. No. 8987); Black Mountain, E. N. McKie, 4.1928 (NSW. No. 8956); Inverell, E. Thomas, 8.1912 (NSW. No. 8989) and 12.1912 (NSW. No. 8999); Woods Reef, Barraba, H. M. R. Rupp, 2.6.1913 (NSW. No. 9128); Gunnedah, K. Willis, 12.1912 (NSW. No. 8984); Gunnedah, E. Cheel, 24.5.1926 (NSW. No. 9864); Tamworth, E. N. McKie No. 246, 23.2.1932 (NSW. No. 9130); Marlee, A. P. Gillogby, 1.1097 (NSW. No. 8998); Scone, J. Vickery, 29.12.1934 (NSW. No. 8959); Belltrees via Scone, H. L. White, 2.1920 (NSW. No. 8983); Belltrees, Scone, S. W. Jackson, 4.1913 (SYD.); Kars Spring, Scone, T. G. B. Osborn, 25.1.1934 (SYD.); Bulga, J. T. Barratt, 4.1920 (NSW. No. 8995, 8996); Dubbo, G. B. Vickery, 13.1.1934 (NSW. No. 9146; SYD.); Dubbo district, per Glenfield Veterinary Research Station, 26.2.1929 (NSW. No. 8992); Ravensworth near Singleton, B. R. Gelling, 1.1912 (NSW. No. 8955); Greta, E. Breakwell, 4.1912 (NSW. No. 8966); Singleton, J. L. Boorman, 4.1908 (NSW. No. 8963); Gordon, W. F. Blakely, 4.1914 (NSW. No. 8988); Gordon, A. H. S. Lucas, 25.3.1916 (NSW. No. 8993); Penrith, J. Vickery, 11.4.1931 (NSW No. 9138; SYD.); Emu Plains, E. Breakwell, 4.1912 (NSW. No. 8968); Menangle, A. A. Hamilton, 8.4.1912 (NSW. No. 8985); Bathurst (cult. from seed from the Lachlan River), A. A. Dunnicliff, 3.1901 (NSW. No. 8981); Leeton, F. Filan, 15.10.1940 (NSW. No. 8961); Wagga Wagga, C. Lyne, 5.1910 (NSW. No. 9132); Holbrook, E. J. McBarron No. 791, 4.4.1947 (NSW. No. 9141); Culcairn, E. J. McBarron No. 3096 (NSW. No. 9126); Table Top, E. J. McBarron No. 3155, 19.3.1949 (NSW. No. 9127).

This species resembles *P. jubiflorum* (Trin.) Hughes, but differs in its more slender lax habit, the spikelets turning outwards and backwards from the rhachis (not adpressed or so very evenly arranged), slightly smaller and much more gibbous, the lower glume inflated at the base giving the spikelet a bent-back appearance, and the broader elliptical-rotund fertile floret.

P. radiatum n. sp.

Gramen perenne subprostratum vel ascendens, e base caespitosa radiatum, vel aliquando suberectum, in nodis inferioribus saepe geniculatum et aliquando ramosum; culmi 2-4-nodes, graciles, tenuiter striati, scaberuli vel sublaeves; nodi adpresso-pubescentes vel glabri; vaginae manifeste carinatae, tenuiter striatae, remote pilosae vel glabrescentes, saepe superne in marginibus collaribusque breviter pilosae, scaberulae; ligula breviter denseque ciliata; laminae 5-15 cm. longae, attenuatae, 1.5-3 mm. latae, plus minusve planae, ad basem paullo carinatae, tenuiter striatae nervo medio manifesto, infra remote et breviter pilosae vel glabrescentes et scabrae, supra tenuiter canaliculatae scabraeque; panicula tandem exserta, usque ad 15 cm. longa, unilateralis, pedunculo compresso, rhachide inaequaliter triquetro, racemos unilaterales spiciformos plus minusve appressos ferens; racemi 0.5-2 cm. longi quam internodi paullo maiores vel manifeste breviores, plerumque 1-nati et non ramosi, aliquando ad spicularum paucarum acervulos redacti, rhachide secundario angulare-triquetro, scabro, aliquanto flexuoso, in seta minuta terminato; pedicelli ca. 0.5 mm. longi, scabri; spiculae in ordinibus duobus alternae, tandem oblique retroque reflexae, gibbosae, plerumque purpurascentes vel viridescentes, ovato-ellipticae, 1.8-2.2 mm. longae; gluma inferior orbiculare-ovata, obtusa vel subacuta, ad basem paullo inflata quam spicula dimidio brevior, 3- sub-5-nervata, nervis lateralibus superne anastomosantibus; gluma superior quam spicula paullo brevior, rotunda, obtusa, circa fructum turgidulum convexa, 5-nervata nervis superne confluentibus; lemma inferius sterile spiculam subaequans, in dorso paullo concavum, late ovatum, acutum, 5-nervatum nervis superne anastomosantibus, palea parvissima; lemma superius fertile ellipticum, ca. 2 x 1 mm., acutum, convexum, crustaceum, tenuiter rugulosum; palea elliptica, similiter crustacea et tenuiter rugulosa, marginibus laevibus; stamina 3.

HOLOTYPE: *New South Wales*: Penshurst, E. Cheel, 3.1907 (NSW. No. 8940. Duplicate at K.).

Sub-prostrate or ascending perennial radiating from a caespitose base or sometimes sub-erect, often geniculate at and sometimes branching from the lower nodes; culms 2-4-noded, slender, compressible, finely striate, scaberulous to almost smooth; nodes adpressed-pubescent or glabrous; sheaths distinctly keeled, finely striate, remotely pilose or glabrescent, often short-pilose on the margins in the upper part especially on one side and on the collar, scaberulous; ligule shortly and densely ciliate; blades 5-15 cm. long, attenuate, 1.5-3 mm. wide, more or less flat, slightly keeled at the base, finely striate, the midrib distinct, remotely and shortly pilose or glabrescent and scabrous on the lower surface, the upper surface shallowly grooved and finely scabrous; panicle at length exserted, up to 15 cm. long, one sided, the peduncle compressed, the rhachis unequally triquetrous, the branches one-sided spike-like more or less appressed racemes 0.5-2 cm. long, slightly longer than to much shorter than the internodes, usually 1-nate and unbranched, sometimes reduced to clusters of very few spikelets, the secondary rhachis very angular-triquetrous, scabrous, somewhat flexuose, each branch terminated by a minute bristle; pedicels about 0.5 mm. long, scabrous; spikelets alternate in 2 rows, bending outwards and backwards from the rhachis at least at maturity, gibbous, often purplish-tinted or greenish, ovate-elliptical, 1.8-2.2 mm. long; lower glume orbicular-ovate, obtuse to sub-acute, slightly inflated towards the base, less than half as long as the spikelet, 3- sub-5-nerved, the lateral nerves anastomosing above; upper glume a little shorter than the spikelet, rotund, obtuse, 5-nerved, the nerves confluent above, convex around the swollen fertile floret; lower lemma about equal to the spikelet, slightly concave dorsally, 5-nerved with the nerves anastomosing at the apex, broadly ovate, acute, with a very small palea in its axil; upper fertile lemma elliptical, about 2 x 1 mm., acute, convex, crustaceous, finely rugulose, folded over the palea; palea similarly crustaceous and finely rugulose, elliptical, the margins smooth; stamens 3.

LOCALITIES: *New South Wales*: Byron Bay, J. H. Maiden and J. L. Boorman, 11.1903 (NSW. No. 8921); Richmond River, Foster, 5.1912 (NSW. No. 8946); Greenridge, D. J. McAuliffe, 3.1907 (NSW. No. 8925); Port Macquarie, J. L. Boorman, 6.1915 (NSW. No. 8935); Milson Island, 14.10.1911 (NSW. No. 8949); Hornsby, W. F. Blakely, 4.1914 (NSW. No. 8920; K.); Rooty Hill, Chief Inspector of Stock, 4.1914 (NSW. No. 8936); Sydney Domain, J. H. Camfield, 17.11.1922 (NSW. No. 8918); Centennial Park, E. Cheel, 5.1901 (NSW.

No. 8947); Centennial Park, O. D. Evans, 4.1929 (SYD.); Homebush, J. Vickery, 19.1.1930 (NSW. No. 8960); Gladesville, H. Deane, 4.1885 (NSW. No. 8938); Clyde, E. Breakwell, 6.1912 (NSW. No. 8934); Hurstville, J. H. Camfield, 4.1901 (NSW. No. 8930); Kogarah, J. H. Camfield, 7.12.1893 (NSW. No. 8926), and 1.1895 (NSW. No. 8933); Oatley, J. H. Camfield, 4.1901 (NSW. No. 8929); Liverpool, E. Cheel, 6.1931 (NSW. No. 8948); National Park, J. Vickery, 3.1930 (NSW. No. 8958).

var. **hirsutum** n. var.

Ab typo in laminis vaginisque manifeste et dense hirsutis pilis ex tuberculis minutis ortis, paniculae rhachide plus minusve hirsuto differt.

Holotype: *New South Wales*: Kurrajong, D. O. Cross (NSW. No. 8944).

Differs from the Type in the leaves and sheaths conspicuously and rather densely hirsute with hairs arising from minute tubercle bases, the rhachis of the panicle also more or less hirsute.

Localities: *New South Wales*: Manning river, E. Betche, 2.1886 (NSW. No. 8945); Pokolbin, Taylor, 2.1936 (NSW. No. 8848).

This species is readily distinguished from *P. jubiflorum*, *P. aversum* and *P. gracile* by the distinctly smaller spikelets. It seems to stand closest to *P. caespitosum* C. E. Hubbard, from which it differs in its lax ascending habit, and broader flat leaves, and, in the Type form, less hirsute foliage.

P. caespitosum is a densely tufted erect plant known chiefly from "Brigalow" country in Queensland. *P. radiatum* is known chiefly from the coastal districts of New South Wales, but specimens recently received indicate that it extends to north-western districts of the State.

PANICUM.

P. queenslandicum Domin var. **acuminatum** n. var.

Ab typo spiculis longioribus (5-6.5 mm.) et flosculis longioribus (3-3.5 mm.), glumis et lemmate inferiore ad apices longe acuminatis differt.

Holotype: *New South Wales*: Glen Innes, H. Wenholz, 3.1913 (NSW. No. 8211. Duplicate at K.).

Differs from the Type in the longer spikelet (5-6.5 mm.) and fertile floret (3-3.5 mm. long), the glumes and lower lemma long-acuminate at their apices.

Localities: *New South Wales*: Six miles south of Guyra on black soil flats, E. N. McKie No. 2323, 21.2.1941 (NSW. No. 8215); Singleton, J. L. Boorman, 11.1914 (NSW. No. 8214); Brockley, 16 miles east of Guyra, E. N. McKie No. 245, 18.2.1932 (NSW. No. 8212); Bellevue, 16 miles west of Glen Innes, E. N. McKie, 2.3.1937 (NSW. No. 8210); Stonehenge, J. H. Maiden, 12.1899 (NSW. No. 8209); Inverell, E. O. Thomas, 12.1912 (NSW. No. 8208); Ben Lomond, J. H. Maiden, 12.1899 (NSW. No. 8207); Warialda, J. Vickery, 1.1932 (NSW. No. 8206).

In the typical form of the species the spikelets are mostly 3.5-4.5 mm. long (rarely from 3-5 mm.), the glumes acuminate but scarcely so long drawn out as in the variety, and the fertile floret is usually 2.5-2.75 mm. long.

The variety appears to be found chiefly on the northern tablelands of New South Wales but extends also to the western slopes. The typical form extends chiefly from the western slopes to the nearer western plains especially in the northern part of the State. The latter is represented in the National Herbarium by the following New South Wales specimens:—

New South Wales: Warialda, C. J. Woollett, 16.4.1930 (NSW. No. 8216); Gravesend, E. Breakwell, 3.1913 (NSW. No. 8228); Gravesend to Glendon, W. M. Carne, 5.1914 (NSW. No. 8229); Moree, G. L. Hobson, 31.7.1909 (NSW. No. 8227); Collarenebri to Walgett, J. Vickery, 21.12.1934 (NSW. No. 8233); Bedgerabong, D. L. W. Henderson, 26.5.1945 (NSW. No. 775); Gurley, E. Breakwell, 11.1912 (NSW. No. 8221); Clarence River (NSW. No. 8219); Barraba, H. M. R. Rupp, 26.2.1914 (NSW. No. 8218); Breeza, W. Court, 5.1899 (NSW. No. 8224); Gular, W. D. Brown, 6.1913 (NSW. No. 8217, 8230); Belltrees, via Scone,

H. L. White, 2.1920 (NSW. No. 8236); Gerelah, Nyngan, J. C. Butchee, 20.2.1936 (NSW. No. 8226); Singleton, J. Vickery, 28.12.1934 (NSW. No. 8234); Singleton, E. Breakwell, 6.1912 (NSW. No. 8225); Parkes, E. Powell, 25.5.1939 (NSW. No. 8231); Narrandera, 4.1913 (NSW. No. 8222); Griffith, R. B. Giltinan, 27.8.1939 (NSW. No. 8232). It also occurs in Queensland.

SETARIA.

S. australiensis (Scribn. and Merrill) n. comb.

SYNONYM: *Chaetochloa australiensis* Scribn. and Merrill, U.S. Dept. Ag., Agrost. Bull. 21 (1900), 29.

Originally described simply as from Australia, this species is known from Queensland and northern New South Wales. It is represented in the National Herbarium by the following specimens:—

Queensland: Prairie, J. R. Chisholm, 3.1921 (NSW. No. 7710, 9016); Rockhampton, R. Simmons, 3.1908 (NSW. No. 9017a).

New South Wales: Moona Plains, A. R. Crawford, 5.1899 (NSW. No. 7712), and 4.1906 (NSW. No. 9017b); Iluka, Hoarty, 3.1938 (NSW. No. 7711); Clarence River, (NSW. No. 7713).

PLAGIOSETUM.

P. refractum (F. Muell.) Benth., Hook. Ic. Pl., t. 1242. (1877).

SYNONYM: *Setaria refracta* F. Muell., Fragm. Phyt. Aust., III (1863), 147; *Pennisetum refractum* (F. Muell) F. Muell., ibid. VIII (1873), 109.

This species occurs on the sandhills of central Australia but does not appear to have been previously recorded within the boundaries of New South Wales, nor included in any works on New South Wales grasses. It has now been found towards the north-west corner of the State.

LOCALITY: *New South Wales*: Fort Grey, N. Beadle, 9.1939 (NSW. No. 8201).

STIPA.

S. nervosa n. sp.

Gramen perenne, caespitosum, robustum, erectum, usque ad 120 cm. altum; culmi rigidi, usque ad 4 mm. diametro, leviter striati, laeves, glabri, 2-4-nodes; nodi tenuiter pubescentes; vaginae quam internodi plerumque breviores, leviter striatae, inter nervos scaberulae, glabrae praeter ad orem pubescentes; ligula firma, ca. 0.5 mm. longa, truncata, paullo pubescens; laminae usque ad 40 cm. longae, rigidiusculae, involutae, attenuatae, cuspidatae, ad bases explanatas 3.5 mm. latae, infra leviter canaliculatae retrorsum scabrae, supra profunde canaliculatae scabro-pubescentes; panicula laxissima, patens vel in sicco laxe contracta, 20-40 cm. longa, axe primario leviter scabro, ramis gracillimis, scabris, pluri-natis, longioribus iterum divisis, spiculas plerumque ad terminos ferentibus, pedicellis 2-10 mm. longis; spiculae pallido-viridescentes vel stramineae, glumis mature valide divergentibus; glumae tenues, chartaceae, inaequales, anguste lineare-attenuatae, paullo involutae, inferior longior 9-12 mm., explanata ca. 1 mm. lata, valide 3-nervata, superior 7-10 mm. longa, explanata paullo latior 3- sub-5-nervata, nervis lateralibus omnibus quam nervis mediis validis et fere ad apices angusto-truncati extensis; lemma firm sed paullo tenuiter induratum, lineare, ca. 6-8 mm. longum callum 1.5 mm. longum includens, ca. 0.8 mm. latum, pallidissimo-fulvum vel purpurascente-fulvum, pubescens pilis albis, papilloso-scabrum, aristatum, marginibus in lobos obtusos obsolescentes productis; arista terminalis, articulata, subrecta vel plus minusve bis geniculata, scabro-pubescens, graciliuscula, 2-5 cm. longa, columna aliquanto contorta; palea lemma longitudine subaequans et textura similis, in dorso pubescens; antherae 3, lineares 3.5-4 mm. longae.

HOLOTYPE: *New South Wales:* Epping, W. F. Blakely, 10.1913 (NSW. No. 8491. Duplicate at K.).

Robust erect caespitose perennial, up to 120 cm. high; culms rigid, stout, up to 4 mm. in diameter, lightly striate, smooth, glabrous, about 2-4-noded; nodes finely pubescent; sheaths usually shorter than the internodes, lightly striate, scaberulous in the grooves, glabrous except pubescent at the orifice; ligule firm, about 0.5 mm. long, truncate, slightly pubescent; blades up to 40 cm. long, stiff, inrolled, attenuate, pointed, 3-5 mm. broad at the base when flattened, shallowly grooved and recurved scabrous on the lower surface, the upper surface deeply grooved and scabrous-pubescent; panicle very lax, spreading, or loosely contracted when dry, 20-40 cm. long, the main rhachis slightly scabrous, the branches very slender, scabrous, several-nate, the longer branches again divided, bearing spikelets chiefly towards the ends of the branches, the pedicels 2-10 mm. long; spikelets pale greenish to straw-coloured, the glumes early much divergent; glumes thin, chaffy, unequal, the lower glume longer, 9-12 mm., the upper 7-10 mm., both narrow linear-attenuate, slightly inrolled, the lower about 1 mm. wide when flattened and strongly 3-nerved, the upper slightly wider and 3- sub-5-nerved, the lateral nerves of both glumes as strong as the midnerve, and continued almost to the narrowly truncate apex; lemma firm but rather thinly indurated, linear, about 6-8 mm. long including the 1.5 mm. callus, about 0.8 mm. wide, very pale brown to purplish-brown, pubescent with white hairs, papillose-roughened, with a terminal, articulate, sub-straight, or slightly twice geniculate, scabrous-pubescent, moderately slender awn 2-5 cm. long, the column slightly twisted, 1-2 cm. long, the margins of the lemma produced into obtuse obsolescent lobes; palea almost as long as the lemma and of similar texture, pubescent on the back; anthers 3, linear, 3.5-4 mm. long.

LOCALITIES: *New South Wales:* Moredun Creek Dam, Guyra district, E. N. McKie, 30.12.1947 (NSW. No. 8494); Guyra, E. N. McKie, 9.12.1946 (NSW. No. 8496); Kilbirnie Block Mountain, Guyra district, E. N. McKie No. 370, 15.1.1935 (NSW. No. 8500); Devil's Pinch, 8 miles south of Guyra, E. N. McKie No. 306 (NSW. No. 8501); Stonehenge, J. H. Maiden, 12.1899 (NSW. No. 8512); Walcha, J. L. Boorman, 12.1912 (NSW. No. 8502); Hornsby, W. F. Blakely, 1.1.1914 (NSW. No. 8493; K.) and 4.1914 (NSW. No. 8508); Homebush, J. Vickery, 21.6.1930 (NSW. No. 8519); Flemington, J. Vickery, 31.3.1929 (NSW. No. 8517); Hurstville, J. H. Camfield, 4.1901 (NSW. No. 8504); Penshurst, E. Cheel, 4.1900 (NSW. No. 8506) and 18.2.1899 (NSW. No. 8510) and 5.11.1899 (NSW. No. 8509); Kogarah, J. H. Camfield (NSW. No. 8511 and 8524), and 11.1893 (NSW. No. 8525); Oatley, J. H. Camfield, 2.11.1902 (NSW. No. 8518); Springwood, H. Deane, 10.1888 (NSW. No. 8521); Katoomba, S. T. Blake, 23.1.1939 (STB. No. 13932; NSW. No. 8516); Mount Irvine Road, J. Gregson, 21.7.1906 (NSW. No. 8498); Mt. Victoria, E. Cheel, 12.1900 (NSW. No. 8527); Mount Jellore, E. Cheel, 16.11.1912 (NSW. No. 8507); Yellow Rock, Albion Park, E. J. McBarron No. 1495, 23.3.1948 (NSW. No. 8523); Hill Top, E. Cheel, 17.12.1911 (NSW. No. 8492; K.) and 6.1.1912 (NSW. No. 8514), and 25.11.1911 (NSW. No. 8515); Mittagong, E. N. McKie, 21.11.1941 (NSW No. 8495); Crookwell, C. C. Hewitt, 9.2.1948 (NSW. No. 8566); Milton, R. H. Cambage No. 2169, 23.12.1909 (NSW. No. 8499); Milton, E. Breakwell, 12.1913 (NSW. No. 8505); Cobargo, E. Breakwell, 12.1913 (NSW. No. 8513; K.); Tantawanglo Mountain, J. Vickery, 14.1.1940 (NSW. No. 8522).

Victoria: Orbost, C. H. Grove, 2.1905 (NSW. No. 8528); Sale, J. Vickery, 26.1.1935 (NSW. No. 8530).

This species is common on the coast and parts of the tablelands of N.S.W. where it tends to be an element in open forest or forest margin country rather than in grazed pastures.

It falls into the group Striatae of Hughes' "Revision of the Australian Species of Stipa" (Kew Bull. 1921, 1), and in the National Herbarium collection was, for a long time, placed with *Stipa pubescens* R. Br. It differs very markedly from that species, however, in its smaller glumes, shorter lemma and much shorter slender awn. Its habit and distribution is similar.

var. **neutralis** n. var.

Ab typo lemmate paullo longiore, 8-9 mm. longo, seta gracili sed manifeste validiore, columna 2.5-3 cm. longa, arista in toto 4.5-7 cm. longa, glumis saepe paullo longioribus latioribusque, inferiore 11-15 mm. longa, superiore 9-13 mm. longa manifeste 5-nervata, lemmatis pilis tandem paullo fulvis differt.

HOLOTYPE: *New South Wales*: Katoomba, S. T. Blake, 22.1.1939 (NSW. No. 8569; STB. No. 13915).

Differs from the Type in the lemma a little larger, 8-9 mm. long, the awn slender but distinctly stouter than in the species, the column 2.5-3 cm. long, the whole awn 4.5-7 cm. long, the glumes often a little longer and broader, the lower 11-15 mm., the upper 9-13 mm. and often more distinctly 5-nerved, the hairs of the lemma becoming slightly fulvous at maturity.

LOCALITIES: *Queensland*: H. Deane, 1889 (NSW. No. 8585).

New South Wales: Yooroonah, E. N. McKie, 12.1.1940 (NSW. No. 8584); Walcha, A. R. Crawford, 6.1900 (NSW. No. 8574); Hornsby, W. F. Blakely, 4.1914 (NSW. No. 8575); Beecroft, W. M. Carne and A. Hudson, 3.5.1914 (NSW. No. 8582); Lane Cove River, L. Stephenson, 11.1930 (NSW. No. 8586); Milperra, Georges River, J. Vickery, 26.10.1930 (NSW. No. 8570); Penshurst, E. Cheel, 1.1912 (NSW. No. 8576); Kogarah, J. H. Camfield, 1900 (NSW. No. 8588); Katoomba, S. T. Blake (NSW. 8577; STB. No. 13914); Katoomba, D. O. Cross, 23.1.1938 (NSW. No. 8572); Katoomba, Deane, 1.1886 (NSW. No. 8583); Hill Top, E. Cheel, 3.1911 (NSW. No. 8571); Barber's Creek, J. H. Maiden, 12.1897 (NSW. No. 8573).

Victoria: Trafalgar, A. Meebold No. 21580, 12.1936 (NSW. No. 8578); Warburton, S. T. Blake, 19.1.1935 (NSW. No. 8580; STB. No. 7219); Near Lilydale, S. T. Blake, 19.1.1935 (NSW. No. 8579; STB. No. 7211).

In this variety the relationship to *S. pubescens* is a little more evident, but the dimensions of the florets are still distinctly smaller than in that species.

DICHELACHNE.

D. rara (R.Br.) n. comb.

SYNONYMS: *Agrostis rara* R.Br., Prod., (1810), 171; *Dichelachne micrantha* var. *rara* (R.Br.) Domin, Biblioth. Bot., 85 (1915), 353; *Vilfa rara* (R.Br.) Beauv., Agrost., (1812), 16, 148, 182; *Muehlenbergia rara* (R.Br.) Trin., Gram. Unifl., (1824) 193.

This species has been much confused with *D. sciurea* (R.Br.) Hook. f., from which it can be distinguished by its more or less spreading panicle (which is usually loosely contracted when dry), with long, filiform branches in well developed specimens, the spikelets borne mostly in the upper half of the branches, and often more slender habit. D. *s*~~*uio*~~ciu*rea* has a dense contracted panicle.

The Type Specimen of *Agrostis* (*s*~~*uio*~~ciu*rea*) is from Port Jackson, R. Brown, No. 6212, preserved at the British Museum of Natural History, and there is a duplicate of this collection at Kew.

'rara' is meant

The species is fairly common in the Sydney district, and on the coast and tablelands of New South Wales generally, where it is usually found in lightly shaded forest country. Specimens in the National Herbarium of New South Wales include the following:—

New South Wales: Elderbury Creek, 7 miles south-west of Guyra, E. N. McKie No. 2482, 15.12.1931 (NSW. No. 7850); Point Lookout, between Armidale and Ebor, C. K. Ingram, 10.12.1938 (NSW. No. 7851); Excelsior, J. L. Boorman, 1.1914 (NSW. No. 7860); Hornsby, W. F. Blakely, 10.1921 (NSW. No. 7855); Wahroonga, W. F. Blakely, 30.10.1913 (NSW. No. 7846); Cheltenham, J. Vickery, 23.12.1947 (NSW. No. 7852); Epping, L. Johnson, 26.10.1946 (NSW. No. 7844); Ryde, H. Deane, 11.1884 (NSW. No. 7845); Rhodes, H. Deane, 4.1887 (NSW. No. 7853); Near Sydney, 4.1894 (NSW. No. 7861); Katoomba, D. O. Cross,

1.1938 (NSW. No. 7856); Katoomba, S. T. Blake No. 13926, 22.1.1939 (NSW. No. 7854); Colo, E. Cheel, 3.1911 (NSW. No. 7841); Kowmung River district, L. Johnson, 28.3.1948 (NSW. No. 7843); Yellow Rock, Albion Park, E. J. McBarron No. 2181 and 2187, 7.10.1948 (NSW. No. 7849, and 7848); Paddy's River, M. E. Phillips, 31.7.1946 (NSW. No. 7847); Nowra, F. A. Rodway, 3.11.1934 (NSW. No. 7858); Milton, E. Breakwell, 28.12.1913 (NSW. No. 7842); Colombo, E. Betche, 2.1893 (NSW. No. 7859); Tantawanglo Mountain, J. Vickery, 15.1.1940 (NSW. No. 7857).

ERAGROSTIS.

E. molybdea n. sp.

Gramen perenne, subglabrum, ex base glabra caespitosa ascendens; culmi usque ad 80 cm. longi, laeves, paullo lucentes, 3-4-nodes, ad nodos inferiores saepe geniculati et aliquando ramosi, ad folia canaliculati, internodis quam vaginis longioribus; nodi glabri; vaginae laxae, glabrae; ligula ciliata, 0.5 mm. longa, ad margines pilis paucis longioribus; laminae lineares, usque ad 2-3 mm. latis, in sicco plus minusve involutae, attenuatae, glabrae vel ad margines nervosque pilis paucis remotis tuberculatis, infra plus minusve laeves sed valide nervatae, supra canaliculatae et ad nervos scabrae; panicula exserta longitudine prope plantae dimidium aequans, ovata vel late lanceolata, ramis paucis remotis alternis divaricatis rigide patentibus horizontalibus, rhachide primario supra ramos canaliculato; rami inferiores usque ad 15 cm. longi semel vel bis divisi, pedicellis 2-11 mm. (plerumque 4-8 mm.) longis, rigide patentibus; paniculae axillae glabrae, condensatione plana ochracea; spiculae lucentes plus minusve molybdaceae vel tandem straminellae, lineares, plerumque 7-13 mm. longae (raro usque ad 22 mm.), 1.5-2 mm. latae, compressae, plerumque 12-14-florae; glumae inaequales, mature deciduae, inferior lineare-oblonga, 1.5 mm. longa, explanata 0.5 mm. lata, obtusa, ad apicem membranacea, nervis obscuris, superior late ovata, 1.75 mm. longa, explanata 1 mm. lata, obtusissima, 1-nervata, ad apicem membranacea; lemmata ad apices paullo patentia, ad bases imbricata, in dorsis recta, 2.25-2.75 mm. longa, late ovata, explanata 1.5 mm. lata, plicata subtriangularia, obtusa, laevia, carinata, valide 3-nervata, nervis lateralibus propius margines, pallidis; palea quam lemma paullo brevior, lineare-oblonga, supra in carinis minute ciliolata, obtusa, marginibus inflexis angustis; antherae 3, pallidae, globulare-oblongae, ca. 3 mm. longae; caryopsis ca. 1 mm. longa, oblonga, truncata, rubicundo-fusca.

HOLOTYPE: *New South Wales*: Singleton, J. L. Boorman, 4.1908 (NSW. No. 7899).

Resembles *E. leptostachya* (R. Br.) Steud., but differs in the usually taller habit, larger and more broadly spreading panicle with longer branches and pedicels, and larger spikelets, 1.5-2 mm. wide, mostly 7-13 mm. long with more numerous florets.

Subglabrous perennial ascending from a glabrous caespitose base, the culms up to 80 cm. long, smooth, slightly shining, 3-4-noded, often geniculate and sometimes branching from the lower nodes, the nodes glabrous, the internodes longer than the sheaths, channelled on the side towards the leaf; sheaths loose, glabrous; ligule consisting of cilia 0.5 mm. long, with a few longer hairs at the margins; blades linear, up to 2-3 mm. wide, more or less involute when dry, attenuate, glabrous or with a few distant tubercle-based hairs on the margins and nerves, more or less smooth but strongly veined on the lower surface, grooved and scabrous on the nerves above; panicle exserted, up to 40 cm. x 30 cm., often occupying nearly half the length of the culm, rigid, ovate to broad lanceolate with few distant, alternate, divaricately and stiffly spreading, more or less horizontal branches, the main axis channelled above the branches, the lower branches up to 15 cm. long again once or twice divided, the pedicels 2-11 (mostly 4-8) mm. long, stiffly spreading; axils of the panicle branches with a flat yellowish thickening, glabrous; spikelets shining, dark, more or less lead-coloured or ultimately fading to straw-coloured, linear, mostly 7-13 mm. (rarely up

to 22 mm.) long, 1.5-2 mm. broad, strongly laterally flattened, 6-22 but usually 12-14-flowered; glumes unequal, early deciduous, the lower linear-oblong, 1.5 mm. long x 0.5 mm. wide when flattened, obtuse, membranous towards the apex, the nerve very obscure, the upper glume broadly ovate, 1.75 mm. long x 1 mm. broad when flattened, very obtuse, 1-nerved, membranous towards the apex; lemmas with their apices slightly spreading, bases imbricate, dorsally straight, 2.25-2.75 mm. long, broadly ovate and 1.5 mm. wide when flattened, sub-triangular when folded, obtuse, smooth, keeled, strongly 3-nerved, the lateral nerves placed closer to the margins than to the midrib, the nerves paler than the dark lemma; palea a little shorter than the lemma, linear-oblong, very minutely ciliolate on the keels in the upper part, obtuse, the inflexed margins narrow; anthers 3, pale, globular-oblong, about 3 mm. long; grain about 1 mm. long, oblong, truncate, reddish-brown.

LOCALITIES: *New South Wales*: Ashley via Moree, E. H. Zeck, 1.1925 (NSW. No. 7874); Mt. Russell, E. Breakwell, 12.1914 (NSW. No. 7868); Gravesend, W. M. Carne, 5.1914 (NSW. No. 7888); Warialda, J. G. Hadley, 5.1908 (NSW. No. 7893); Warialda, J. Vickery, 1.1932 (NSW. No. 7877); Warialda, H. M. R. Rupp, 3.1906 (NSW. No. 7875); Gravesend, E. Breakwell, 3.1913 (NSW. No. 7884); Fairborn, E. N. McKie, 5.1.1948 (NSW. No. 7895); Armidale, C. K. Ingram, 12.1938 (NSW. No. 7872); Rob Roy, near Inverell, J. W. Kuhl, 2.1917 (NSW. No. 7867); Bingara, W. M. Carne, 3.1913 (NSW. No. 7885); Pilliga Scrub, H. M. R. Rupp, 10.1918 (NSW. No. 7886); Plains near Baradine, W. Forsyth, 10.1899 (NSW. No. 7891); Belltrees via Scone, H. L. White, 2.1920 (NSW. No. 7898); Belltrees, Upper Hunter River, S. W. Jackson, 4.1913 (NSW. No. 7881); Scone, J. Vickery, 29.12.1934 (NSW. No. 7879); Six miles west of Wellington, D. L. W. Henderson No. 255, 21.12.1946 (NSW. No. 7871); Bathurst, W. L. Waterhouse, 4.1913 (NSW. 7897); Bathurst, R. M. Peacock, 1.1910 (NSW. No. 7896); Bathurst, R. J. Noble, 12.2.1914 (NSW. No. 7887).

E. microcarpa n. sp.

Gramen perenne, gracile, erectum, caespitosum, 30-60 cm. altum, ad basem paullo lanatum; culmi 3-4-nodes, teretes, graciles, firmi, laeves; nodi glabri; vaginae strictae, glabrae, laeves plerumque quam internodi breviores; ligula brevissima, ciliata; laminae 5-10 cm. longae, involutae, tenuiter attenuatae, ad basem explanatae 1.5-2 mm. latae, infra striatae plus minusve laeves ad margines pilosae vel glabrescentes, supra pilosae pilis longis tenuibus ad nervos paullo scabrae; panicula exserta tandem pyramidalis, 15-20 cm. longa, ad basem ca. 12-15 cm. lata; rami tandem horizontaliter patentes, superiores 1-nati alternati, inferiores 1-4-nati aliquando approximati; pedunculus teres, laevis; rhachis primarius subcompressus, canaliculatus, infra laevis, supra scaber, ramis scabris, ramis primariis ramulos adpressos aliquando iterum divisos ferentibus; spiculae ad axem appressae, breviter pedicellatae, pallidae vel purpurascentes, lineares, ca. 1.25 mm. latae, ca. 10-12-florae; glumae 1-nervatae, subhyalinae, oblongae, erosae, in carinis paullo scabrae, inaequales, inferior ca. 1 mm. longa et explanata 0.4 mm. lata, superior ca. 1.4 mm. longa et explanata ca. 0.6 mm. lata; lemmata subhyalina, oblongo-ovata, obtusa, 3-nervata, laevia; palea ca. 1-1.2 mm. longa, ca. 0.25 mm. lata, plus minusve linearis, hyalina, supra in carinis minutissime ciliolata; antherae 3, purpurascentes, reniformes, minutae, diametro ca. 0.15 mm.; caryopsis parvissima, globulare-oblonga, ca. 0.4 mm. longa, ochraceo-fulva, expedite decidua.

HOLOTYPE: *New South Wales*: Bourke, J. Vickery, 22.12.1934 (NSW. No. 9208).

Slender, erect, caespitose perennial, 30-60 cm. high, slightly woolly at the base; culms 3-4-noded, terete, slender, firm, smooth; nodes glabrous; sheaths closely enclosing the culms, usually shorter than the internodes, glabrous, smooth; ligule very short, ciliate; blades 5-10 cm. long, inrolled, finely attenuate, 1.5-2 mm. broad at the base when flattened, the lower surface striate, more or less smooth, pilose towards the margins or glabrescent, the upper surface pilose with long fine hairs, slightly scabrous on the nerves; panicle exserted, at maturity pyramidal, 15-20 cm. long x about 12-15 cm. broad at the base, the branches at length spreading almost at right angles to the main axis, the upper branches 1-nate and alternate, the lower branches 1-4-nate and sometimes approximate, the peduncle terete, smooth, the primary axis sub-compressed, channelled, smooth below, finely scabrous above, the branches all scabrous, the primary branches bearing several adpressed branchlets sometimes again divided; spikelets all more or less adpressed to the axes, shortly pedicellate, pale or tinged with purple, about 1.25 mm. broad, linear, about 10-12-flowered; glumes 1-nerved, sub-hyaline, oblong, erose at the apex, slightly scabrous on the keels, unequal, the lower about 1 mm. long and 0.4 mm. broad when flattened, the upper about 1.4 mm. long and 0.6 mm. broad when flattened; lemmas sub-hyaline, oblong-ovate, obtuse, 3-nerved, smooth; palea about 1-1.2 mm. long x about 0.25 mm. broad, more or less linear, hyaline, very minutely ciliolate on the keels in the upper part; anthers 3, at least in some florets, purplish, reniform, minute, about 0.15 mm. diameter; grain very small, globular-oblong, about 0.4 mm. long, golden brown, readily dropping.

Localities: *Queensland*: Jericho, R. Simmons, 1.1908 (NSW. No. 9214); Jericho, S. T. Blake, 27.11.1935 (STB. No. 10251; K.; NSW. No. 9220); Earlstown, Gregory South District, S. T. Blake, 24.6.1934 (STB. No. 5463A; K.; NSW. No. 9218); Mekaree, near Emmet, S. T. Blake, 12.7.1934 (STB. No. 6733; K.; NSW. No. 9219); Charleville, S. T. Blake, 4.4.1936 (STB. No. 11025; NSW. No. 9215); Cunnamulla, S. T. Blake, 12.4.1936 (STB. No. 11193; K.; NSW. No. 9222).

New South Wales: Collarenebri to Walgett, J. Vickery, 21.12.1934 (NSW. No. 9206); Angledool, Newcomen (NSW. No. 9212); Byrock, J. Vickery, 22.12.1934 (NSW. No. 9209); Waverley Downs, A. W. Mullen, 4.1906 (NSW. No. 9211); Nyngan, Little (NSW. No. 9210); Warren, L. Peacocke (NSW No. 9207); Coolabah, J. L. Boorman, 6.1901 (NSW. No. 9213); Coolabah, J. C. Butchee, 7.2.1941 (NSW. No. 9216, 9217); Yenda, D. L. W. Henderson No. 389, 27.3.1948 (NSW. No. 9268).

Of the other species of *Eragrostis* found in New South Wales, this species most resembles *E. leptocarpa* Benth. in appearance, but differs in its perennial habit, very short globular-oblong fruit, slightly broader spikelets and inrolled leaves more or less pilose at least when young.

AGROPYRON.

A. retrofractum n. sp.

Gramen perenne, erectum, caespitosum, parviusculum, ca. 20-35 cm. altum; culmi 2-3-nodes, striati, laeves, praeter infra spicam glabri, quam vaginis internodis longioribus; nodi glabri; folia praesertim in sicco cinereo-viridia; vaginae inferiores hirsuto-pubescentes, scabriusculae, superiores plus minusve glabrae laevesque; ligula truncata, ca. 0.5 mm. longa; laminae lineares, usque ad 15 cm. longae, 2 mm. latae, planae vel in sicco laxe involutae, lamina superiore plerumque breviore lanceolataque, infra striatae dense pubescentes pilis ca. 0.5 mm. longis pilis brevissimis interspersis scaberrimae, supra canaliculatae dense scabro-pubescentes; pedunculus longe exsertus, infra spicam pilis retrorsis hirsutus; spica 1.5-6 cm. longa, 4-10 spiculas ferens, rhachide flexuoso, inciso, contra spiculam complanato glabroque aliter dense et tenuiter hirsuto pilis retrorsis; spiculae 5-9-flora, pallido-virides vel stramineae, latere uno juxta rhachidem locato; glumae tandem abrupte oblique vel retrorsum reflexae, ad callum firmum adhaerentes, anguste triangulares, acuminatae, subulatae, cuspidatae, glabrae, laeves, rigidae, subaequales, 6-7 mm. longae, striatae nisi marginibus involutis chartaceis induratae, inferior ca. 5-nervata nervo principi laterali, superior ca. 7-nervata nervo principi excentrali, lemmata nisi marginibus angustis chartaceis indurata, glabra, superne remote scabra, anguste lanceolata vel explanata angusto-ovata, ad acumina setiforma usque ad 0.5-3 mm. longa acuminate angustata, 5-7-nervata, 9-10 mm. longa, aliquanto divergentia, infra in dorso rotundata, supra paullo carinata;

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VICTORIA

palea quam lemma paullo brevior, ca. 6-7 mm. longa, in dorso concavissima, lineare-lanceolata, ad apicem obtusum angustata, indurata, glabra, supra in carinis scabro-ciliata; stamina 3, angusto-linearia 2.5 mm. longa; ovarium lineare, truncatum, ad apicem pubescens; styli terminales.

Holotype: *New South Wales*: Rock Flat near Cooma, E. Betche, 2.1893 (NSW. No. 9116. Duplicate at K.).

Erect, caespitose, rather small perennial, about 20-35 cm. high; culms 2-3-noded, the internodes longer than the sheaths, striate, smooth and glabrous except just below the spike; nodes glabrous; leaves greyish green at least when dry; lower sheaths hirsute-pubescent, rather scabrous, the upper more or less glabrous and smooth; ligule truncate, about 0.5 mm. long; blades linear, up to 15 cm. long and 2 mm. wide, the uppermost leaf usually much shorter and linear-lanceolate, flat or loosely inrolled on drying, the lower surface striate and densely hirsute-pubescent with hairs about 0.5 mm. long interspersed with much shorter hairs, very scabrous, the upper surface grooved and very scabrous-pubescent; peduncle long exserted, hirsute with reflexed hairs for a few cm. below the spike; spike 1.5-6 cm. long bearing about 4-10 spikelets, the rhachis flexuose, notched, flattened against the spikelet, densely and finely hirsute with reflexed hairs except in the flattened portion; spikelets 5-9-flowered, pale greenish to straw-coloured, placed sideways to the rhachis; glumes sharply reflexed outwards to downwards at maturity, attached to a firm callus, narrowly triangular, acuminate, subulate-pointed, subequal, glabrous, smooth, rigid, persistent, 6-7 mm. long, indurated except for the inrolled chartaceous margins, striate, the lower about 5-nerved with the main nerve on one side, the upper glume about 7-nerved with the main nerve excentric; lemmas indurated except for the narrow chartaceous margins, glabrous, remotely scabrous in the upper part, narrowly lanceolate in section, narrow ovate when flattened, acuminately narrowed into subulate awn-like points 0.5-3 mm. long, 5-7-nerved, 9-10 mm. long, somewhat divergent, rounded on the back below, slightly keeled above; palea shorter than the lemma, about 6-7 mm. long, very concave at the back, scabrous-ciliate on the keels in the upper part, linear-lanceolate, narrowed into an obtuse apex, indurated, glabrous; stamens 3, narrow-linear, 2.5 mm. long; ovary linear, truncate, pubescent towards the apex; styles terminal.

Localities: *New South Wales*: Nimitybelle, M. R. N. Makin, 12.1913 (NSW. No. 8012); 10 miles west of Nimmitabel, R. Ament, 19.5.1949 (NSW. No. 8241); Nimitybelle to Cooma, J. H. Maiden, 12.1896 (NSW. No. 8009); Cooma, H. Deane, 12.1886 (NSW. No. 8010); Cooma, W. D. Hardy, 20.12.1940 (NSW No. 9115; K.); 10 miles south-east of Cooma, R. Ament, 1949 (NSW. No. 8242); Cooma, J. H. Camfield, 12.1896 (NSW. No. 8013); Bibbenluke, J. B. Cleland, 3.1913 (NSW. No. 8011); Home Rule near Gulgong, J. L. Boorman, 12.1916 (NSW. No. 9114; K.; BRI.).

Victoria: Maneroa, F. Mueller (K.); Snowy River, F. Mueller (K.).

A. pectinatum (Labill.) Beauv., Agrost., (1812), 102, 146, 163.

Synonyms: *Festuca pectinata* Labill., Pl. Nov. Holl., (1804), 21, t. 25; *Triticum pectinatum* (Labill.) R.Br., Prod., (1810), 179; *Vulpia pectinata* (Labill.) Nees, Lond. Jour. Bot., II (1843), 419; *Triticum Brownei* Kunth, Rev. Gram., I (1829), 145, and Enum. Pl., I (1833), 447.

This species and the preceding are closely related, and, in fact, specimens of *A. retrofractum* have in the past been referred to *A. pectinatum*. The two species may be distinguished by the following characters:—

A. pectinatum.—Lemmas indurated-herbaceous, loosely hirsute-pubescent throughout except for the awn-like points which are up to 6 mm. in length.	*A. retrofractum.*—Lemmas strongly indurated, glabrous, smooth at the base, remotely scabrous in the upper part. Awn-like points up to 3 mm. in length.
Hairs of the rhachis directed upwards, those of the peduncle directed downwards, almost the whole length of the peduncle scabrous-pubescent.	Hairs of both rhachis and peduncle directed downwards, the peduncle hirsute for only a few cm. below the spike, otherwise more or less smooth.
Whole spikelets early reflexed outwards or downwards from the rhachis.	Group of lemmas usually only divergent from the rhachis, only the glumes strongly reflexed.
Chartaceous margins of glumes narrow or obsolete.	Glumes with inrolled chartaceous margins.

A. retrofractum is known chiefly from the tablelands surrounding the Australian Alps in southern New South Wales and Victoria, on the mainland. *A. pectinatum,* which is admirably illustrated by Labillardiere, is known only from Tasmania.

Material of *A. pectinatum* examined includes the following:—

TASMANIA: N. Holl., Labillardière (a duplicate at K.); Archer (NSW. No. 8015; K.); Recherche Bay, Gunn No. 1474 (NSW. No. 8016; K.); Hampshire, Gunn No. 999, Feb. 1837 (NSW. No. 8016; BRI.; K.); Tarraleah, Central Plateau, alt. ca. 3,000 feet, W. M. Curtis No. 102, 7.1.1945 (K.); Southport, Stuart, 12.1855 (K.); River Dee on Lyell Highway, J. Vickery, 19.1.1949 (NSW. No. 7480).

A. scabrum (R.Br.) Beauv. var. **plurinerve** n. var.

Ab typo glumis latioribus longioribusque (10-15 mm. longis), 6-8 nervatis, manifeste striatis, obtusis vel acutis, firmis, marginibus chartaceis, lemmatibus circa caryopses turgidiusculis, ad aristas expedite angustatis differt.

HOLOTYPE: *New South Wales*: Inverell, E. O. Thomas, 12.1912 (NSW. No. 8245).

Differs from the Type in the broader and longer glumes (10-15 mm. long), which are 6-8-nerved and conspicuously striate with chaffy margins, obtuse to acute, firm. Lemmas rather turgid around the grain, narrowing quickly into the awn.

LOCALITIES: *Queensland*: Darling Downs district: Cecil Plains, F. A. Cox, 9.1930 (K.); About 3 miles south-east of Blaxland, L. S. Smith and S. L. Everist No. 811A, 13.10.1940 (K.); Jondaryon, W. Kent (K.).

New South Wales: Warialda, J. Vickery, 1.1932 (NSW. No. 8247); Inverell, E. O. Thomas, 11.1912 (NSW. No. 8246); Barraba, H. M. R. Rupp, 26.2.1914 (NSW. No. 8248); Narrabri, per Glenfield Veterinary Research Station, 8.10.1936 (NSW. No. 8252); Bourke, E. F. Constable, 16.9.1947 (NSW. No. 4650); Gunnedah, W. R. Hyem, 6.6.1939 (NSW. No. 8249); Scone, F. Haron, 13.11.1935 (NSW. No. 8251).

In *Agropyron scabrum,* as it is at present understood in Australia, considerable variation occurs in the length of the glumes and the awns of the lemmas. However, the variety described above shows such a marked variation from the other forms that it appears worthy of recognition in subspecific rank. The glumes of the other forms of *A. scabrum* are usually 3-4-nerved, rarely 5-nerved, acute, acuminate, or with a short awn-like point. In a fragment of the Type Specimen at Kew the awns of the lemma are short, but the specimen is very incomplete. In specimens in the National Herbarium the awns often vary considerably even on the one specimen. Other specimens show very long awns, more or less straight or recurved to a varying degree, either narrowing rather quickly at the base, or broad and scarcely differentiated from the lemma. The combination of characters is so variable that attempts to recognise taxonomic units within the species have not so far been successful.

A. scabrum was first described by Labillardière (Pl. Nov. Holl., I, 22, t. 26) in 1804 as *Festuca scabra,* but this name is pre-occupied by *F. scabra* Vahl (1790-94), and is therefore illegitimate. Robert Brown (Prod., 1810, 179) used the same epithet in the genus *Triticum* and called the plant *Triticum scabrum,* based on Labillardière's *F. scabra.* This was legitimate, but under the International Rules Brown's name for the species must be regarded as a new name and not a new combination, so that nomenclaturally the epithet "scabrum" dates from his use of it. Other synonyms referable to the species are: *Vulpia scabra* (R.Br.) Nees in Lehmann, Pl. Preiss., II (1846), 108; *Vulpia Browniana* Nees in Lehmann, Pl. Preiss., II (1846), 107, and Hook. Lond. Jour. Bot., II (1843), 419; *Vulpia rectiseta* Nees in Lehmann, Pl. Preiss., II (1846), 107; *Vulpia scabra* (R.Br.) Nees, in Hook. Lond. Jour. Bot., II (1843), 419; *Festuca rectiseta* (Nees) Steud., Syn. Pl. Glum., I (1854), 304; *Festuca Browniana* (Nees) Steud., Syn. Pl. Glum., I (1854), 304; *Festuca Billardieri* Steud., Syn. Pl. Glum., I (1854), 304; *Anthosachne australasica* Steud., Syn. Pl. Glum., I (1854), 237.

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a 225621

A Hitherto Undescribed *Kochia* (Chenopodiaceae)

L. A. S. Johnson, B.Sc.

The name *Kochia planifolia* F. Muell. is commonly applied in New South Wales and South Australia to an important bluebush, which is frequently associated with *K. sedifolia* F. Muell. While engaged recently in sorting herbarium material of *K. sedifolia* and "*K. planifolia*" I noticed that the type of *K. planifolia* F. Muell., from the Murchison River, Western Australia, appeared to differ considerably from the species known under that name in the more eastern states. On closer examination it was found that the latter species differs in a number of important characters from true *K. planifolia.* A search of the literature has revealed no earlier name applicable to this species, although it has frequently been described as "*K. planifolia*" (e.g. by Black, 1948), so it is here described as a new species. Since *K. sedifolia* is rather similar to the new species, and has been confused with it in the herbarium, a key to the three species concerned is given.

KEY.

1. Hairs of the indumentum stellately branched. Leaves flattish to fleshy, always contracted into a short but distinct petiole. Tube of fruiting perianth hard, turbinate, 0.3 to 0.5 cm. long, perianth lobes prominently raised above the level of the wing .... *K. astrotricha* 1.

1.* Hairs of the indumentum simple or occasionally and irregularly branched, usually with numerous tubercles or projections. Leaves flat or fleshy. Tube of fruiting perianth shorter and more slender than in the preceding species, perianth lobes flat.

    2. Leaves clavate-terete, not contracted into a slender petiole .... *K. sedifolia* 2.

    2.* Leaves spathulate, flat or slightly fleshy, contracted into a short slender petiole............ *K. planifolia* 3.

1. K. astrotricha L. Johnson, sp. nov.

Typification: Silverton, N.S.W., I. M. Pidgeon and J. W. Vickery, 24.8.1939, Holotype (NSW. No. 7945).

Frutex dense ramosus ca. ~~1 m.~~ 50 cm. altus habitu aspectuque *K. sedifoliae* similis, omnibus partibus alis fructuum exceptis *tomento densissimo stellato* incanus. Rami ramulique rigidi divaricati sub tomento striati. Folia numerosa spathulata vel clavata, plana vel subtumida, *semper in petiolos distinctos breves tenues contracta,* 0.3 ad 1.0 cm. longa, 0.2 ad 0.4 cm. lata vel crassa. Perianthium fructiferum ala inclusa 0.8 ad 1.5 cm. latum; *tubus turbinatus durus* 0.3 *ad* 0.5 *cm. longus stellato-tomentosus;* ala leviter 5-sinuata, subcrispata utrinque glabrescens vel parce stellato-puberula; perianthii lobi prominentes, stellato-tomentosi.

SPECIMENS EXAMINED: *New South Wales*: Tibooburra, E. F. Constable, 18.10.1949 (NSW. No. 10704); Silverton, I. M. Pidgeon and J. W. Vickery, 24.8.1939, HOLOTYPE (NSW. No. 7945); 90 miles E. of Broken Hill, I. M. Pidgeon and J. W. Vickery, 20.8.1939 (N.S.W. No 1193). *South Australia*: Mt. Lyndhurst, M. Koch No. 189 partim, 5.1898 (NSW. No. 7946); Mt. Lyndhurst, M. Koch No. 189 partim, 3.1900 (NSW. No. 7947); Kingoonya to Mt. Eba, H. Basedow No. 14, 4 to 5.1917 (NSW. No. 7948).

Although represented by only a few specimens this is a widespread and abundant species in "bluebush" country in the farthest west of New South Wales and in the arid parts of South Australia. In the field it is frequently associated with *K. sedifolia* which it much resembles, but the bushes of *K. astrotricha* are usually of a darker hue than those of *K. sedifolia*. *K. astrotricha* is readily separated from *K. sedifolia* by the stellately branching hairs of the indumentum, as well as by the shape of the fruit and the contracted bases of the leaves. From *K. planifolia* it is distinguished by fruit shape and the stellate hairs. These hairs are undivided for half or more of their length, then several tiers of stellately spreading branches are given off. They are much less twisted and contorted than the hairs of *K. sedifolia* and are free of the projections found on the latter.

The species is probably dioecious, like *K. sedifolia*. On NSW. No. 7946 Koch has the note "Male flowers and female flowers are on *separate* plants at all the shrubs I examined."

2. K. sedifolia F. Muell. in Trans. Vict. Inst. (1855) 134, and in Hook. Journ. Bot. VIII (1856) 205.

TYPIFICATION: Mueller cited informally what must be regarded as three SYNTYPES, viz.: "On the banks of the Murray and Darling Rivers, and in dry subsaline places towards Spencer's Gulf and Lake Torrens." It is desirable to select a lectotype from this series, as follows: Darling River, Mrs. Ford, LECTOTYPE (NSW. No. 7960; no doubt there is a duplicate of this in Herb. Melb., but I have not seen it).

SPECIMENS EXAMINED: *New South Wales*: Broken Hill and Tarrawingee, H. Deane, 8.1893 (NSW. No. 7949); Mundi Mundi Station (West of Silverton), E. F. Constable, 24.11.1947 (NSW. No. 4897); Broken Hill, E. C. Andrews, 12.1917 (NSW. No. 7950); Broken Hill, A. Morris, 1.1920 (NSW. No. 7951), male and female plants; 10 miles W. of Broken Hill, L. A. S. Johnson, 29.8.1946 (NSW. No. 2962); 30 miles W. of Wentworth, J. W. Vickery, 20.8.1946 (NSW. No. 1922); Darling River, Mrs. Ford, LECTOTYPE (NSW. No. 7960). *Victoria*: Murray River, Dallachy, LECTOPARATYPE (NSW. No. 7952). "Victoria, also W. Austr." C. Walter (NSW. No. 7953). *South Australia*: Murray Flats, W. of Blanchetown, J. B. Cleland, 5.1911 (NSW. No. 7954); Moolooloo Station, between Beltana and Blinman, Mrs. R. S. Rogers, No. 1951 (NSW. No. 7955); Fowler's Bay, Mrs. T. Brown, 10.1907 (NSW. No. 7956). *Western Australia*: Victoria Spring, R. Helms, 9.1891 (NSW. No. 7957); Kurrawang, J. B. Cleland, 5.1907 (NSW. No. 7958).

K. sedifolia is a well-known species and an important fodder plant. It is distinguished from *K. astrotricha* by the shape of the fruit, by the thick leaf-bases, by the leaves never flattened, and by the very different hairs of the indumentum, which are long, closely packed, twisted and contorted, simple or irregularly but never stellately branched, and which bear numerous tubercles, projections and very short branches. It is distinguished from *K. planifolia* chiefly by the leaf shape.

3. K. planifolia F. Muell., Fragm. Phytogr. Austral. I (1859) 213.

TYPIFICATION: Murchison River, W.A., A. Oldfield. HOLOTYPE (by monotypy), (NSW. No. 7959, ISOTYPE or CLASTOTYPE).

I have seen no specimens of the true *K. planifolia* other than the specimen cited above. It is clearly distinguished from *K. astrotricha* by the nature of the hairs which are similar to those of *K. sedifolia* but less contorted, and by the fruits which are smaller and less tomentose than those of *K. astrotricha*. Its affinity is probably with the complex of species which has been known as *K. tomentosa*. This complex is being investigated.

LITERATURE CITED.

Black, J. M. (1948). Flora of South Australia, ed. ii. II: 312.

Contributions from the N.S.W. National Herbarium

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NATIONAL HERBARIUM
South Yarra
S.E. 1

ERRATA.

Page 6, line 1, for ‘*Schedonorus scirpoidea*’ read ‘*Schedonorus scirpoideus.*’
,, 9, ,, 47, for ‘latis’ read ‘lateribus.’
,, 10, ,, 46, for ‘latis’ read ‘lateribus.’
,, 12, ,, 21, for ‘late’ read ‘latere.’
,, 13, ,, 22, for ‘latoque’ read ‘latereque.’
,, 19, ,, 7, for ‘diocia’ read ‘dioica.’
,, 28, ,, 15, for ‘Cromwell’ read ‘Gromwell.’
,, 28, ,, 41, for ‘Molucella’ read ‘Moluccella.’
,, 29, ,, 8, for ‘chinese’ read ‘chinense.’
,, 31, ,, 9, for ‘artemisifolia’ read ‘artemisiifolia.’
,, 31, ,, 20, for ‘pyncnocephalus’ read ‘pycnocephalus.’
,, 32, ,, 24, for ‘Pear’ read ‘Lettuce.’
,, 49, ,, 41, for ‘teeta’ read ‘tecta.’
,, 63, ,, 25, for ‘pallum’ read ‘paullum.’
,, 72, ,, 39, for ‘remorum’ read ‘ramorum.’
,, 74, ,, 35, omit whole line, from ‘l.c.’ to ‘*Calamagrostis.*’
,, 75, ,, 33, after ‘4.’ omit ‘Lower.’
,, 89, ,, 22, for ‘1–2–3’ read ‘1.2–3.’
,, 118, ,, 4, for ‘9’ read ‘8.’
,, 217, ,, 2 and 3 of the description of *S. campylantha*, for ‘mm.’ read ‘cm.’
,, 264, ,, 19, for ‘ssp.’ read ‘var.’
,, 264, ,, 56, for ‘sspp.’ read ‘vars.’
,, 268, ,, 32, after ‘1.5–2.5’ insert ‘mm.’
,, 288, ,, 15, for ‘equally’ read ‘equalling.’
,, 294, ,, 1, for ‘*hirsuta*’ read ‘*hirsutus.*’
,, 294, ,, 5, for ‘penicula’ read ‘panicula.’
,, 294, ,, 19, for ‘*breviseta*’ read ‘*brevisetus.*’
,, 294, ,, 24, omit whole line, from ‘Localities’ to ‘N.S.W.’ and substitute ‘Leaves and sheaths often hirsute. Glumes ciliate as in var. *setifer*. Lemma.’
,, 294, ,, 48, for ‘*breviseta*’ and ‘*hirsuta*’ read ‘*brevisetus*’ and ‘*hirsutus*’ respectively where occurring.
,, 295, ,, 6 and line 37, for ‘*breviseta*’ read ‘*brevisetus.*’
,, 310, ,, 12, under heading South Africa in right-hand column, for ‘HOLTHRIX’ read ‘HOLOTHRIX.’
,, 315, last line, for ‘(1847)’ read ‘(1850).’
,, 316, line 29, for ‘*Phylloclodus*’ read ‘*Phyllocladus.*’
,, 324, ,, 22, for ‘gabrous’ read ‘glabrous.’
,, 329, ,, 9, in right-hand column, for ‘silghly’ read ‘slightly.’
,, 331, ,, 43, for ‘regulosa’ read ‘rugulosa.’
,, 337, ,, 37, for ‘D. *suoirea*’ read ‘*D. sciurea.*’
,, 337, ,, 38, for ‘*suqiria*’ read ‘*sciurea.*’
,, 344, ,, 1, for ‘1 m.’ read ‘50 cm.’

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